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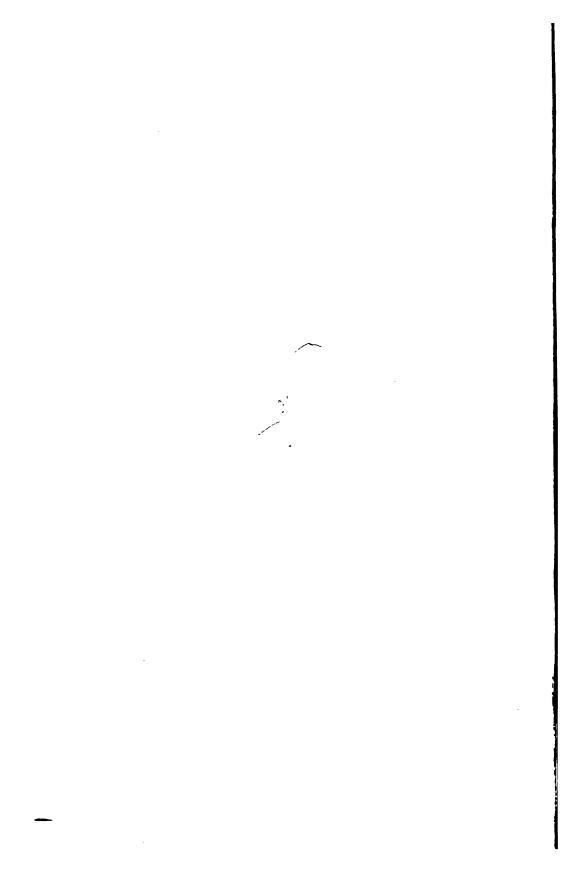
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all published

IOWA HORTICULTURE

MONTHLY BULLETIN

OF

PLANT LIFE

EDITED BY
WESLEY GREENE
SECRETARY

PUBLISHED BY THE
STATE HORTICULTURAL SOCIETY
DES MOINES, IOWA
1908

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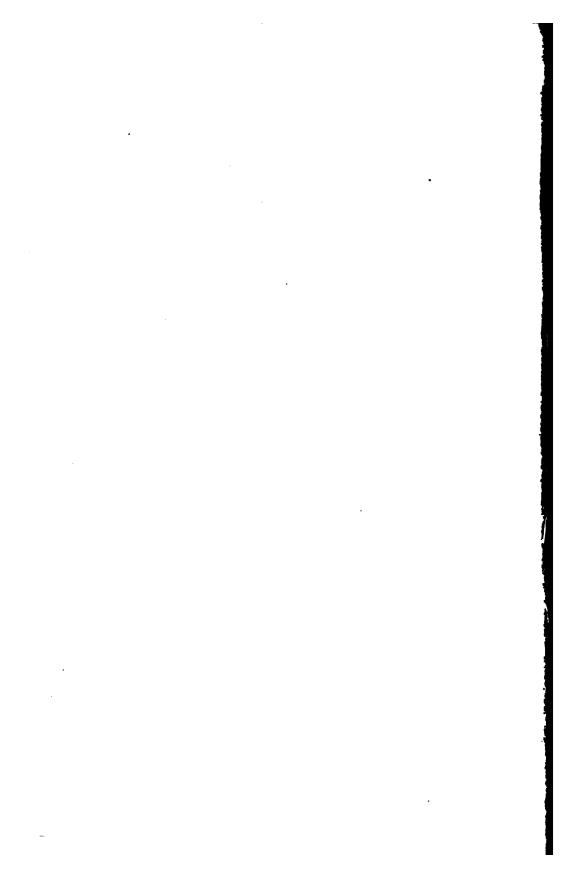
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JANUARY

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IOWAHORTICULTURE

1908

MONTHLY BULLETIN

OF

PLANT LIFE

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STATE HORTICULTURAL SOCIETY
DES MOINES, IOWA

IOWA HORTICULTURE

ISSUED MONTHLY

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IOWA HORTICULTURE

VOL. 1

JANUARY, 1908

NO. 1

WITH THE PICKERS.

BY WILLIAM LANGHAM, CEDAR RAPIDS.

(Read before the State Horticultural Society.)

There is a fascination in the fruit harvest that holds the pickers as with a magic spell. Year after year they come back, bringing with them their younger brothers and sisters as they reach the proper age. Thus it has often happened that every member of the family has served time with us, and not infrequently in the greatest rush the parents themselves have given us a helping hand.

This trait is of great importance and advantage to the commercial fruit-grower. Old and regular pickers know just what is required of them and drop into their accustomed places each season, doing their work not only more easily, but neater and better in every way. Then they are worth not a little in "breaking in" new beginners. Put a new beginner with an old picker. and he soon learns all about it, just as a raw recruit put in a company of well-drilled soldiers, learns the evolutions and manual of arms in one-half the time he would otherwise. Fourfifths of our help comes from Cedar Rapids. This city has a motley population. In addition to the regular American contingent, every nation of Europe, I believe, is represented. It is. quite needless to say that every shade of Christian belief and every cult is found there. All these nationalities and creeds are reflected in our pickers. Americans, Bohemians, Germans and Irish largely preponderate. In religion, Catholics and Protestants are about equally divided. I mention these facts simply for information.

If one is not near—very near—his base of supplies, to use a military phrase, he will find it highly advantageous to keep at least half of his picking force on his grounds. To be successful one must keep fruit picked up closely, and to do this, he must have reliable help. And help is never so reliable as when he has it right under his absolute control. A threatened rain, a circus in the city, or some other great occasion, will give those who live at some distance an excuse to take a holiday. But as a thorn in the flesh the Fourth of July bears the palm.

Right in the midst of the harvest it requires two or three days to celebrate it properly. Instead of being a red-letter day in the calendar, it ought, from a horticultural point of view, be painted as black as the ace of spades. (I have heard that this ace is black.) It requires great virtue to raise small fruit and be patriotic at the same time.

With us every thing possible is done to induce pickers to stay right on the grounds. Rooms, tents, anything that will house and shelter them is dedicated to their use—free. Nothing pleases us more than to have whole families, parents and all, and more children the better, come and stay with us. Parents will get twice the work out of the youngsters that you can, and take all the care of looking after them off your hands besides. In many ways pickers are much like other people. Some draw their pay every week, and in many instances, every day, if they have a chance to spend it, while others leave it stand till the close of the season and get it all in one lump sum. A great majority of the pickers, those under age, I mean, and who constitute nine-tenths of the whole force, are permitted by their parents or guardians to draw their pay and spend it as they choose. And many of them are improvident enough. Why I have seen pretty good fire-works at our place on the glorious Fourth of July, all bought with money chipped in by the pickers. But I have known many instances where boys and girls, ten to fifteen years old, have taken all their earnings home, and always to the mother, never to the father. How I have wondered at, and admired their filial love and devotion as I have watched them toiling day after day and week after week, under a torrid sun, without a murmur or complaint.

Let me here drop a hint. If there should be any infectious disease epidemic in the territory from which one draws his help. the greatest care should be observed. In the case of small-pox, I would advise that no one should be employed unless vaccinated. Vaccination is a sort of insurance that may save one much trouble and loss. This scourge of late years has been so prevalent that even unfounded rumors may precipitate a panic at times, and a panic is as bad for the fruit-grower as the reality. I speak from experience. It is an old saying, that if you want to find a man out, winter with him. Let me change this. If you want to find a picker out, summer with him. If you have fifty or more camping with you, or if you don't, as the seasons come and go, you will learn a great many things which you never knew before, and have experiences which you never dreamed of. You will learn all about your pickers and their home surroundings. You will have all kinds and conditions of people with you. Among so many young folks, there is more or less-generally more-trickiness and mischief, and you will

suffer annoyances in time and out of time, and your temper will be in an incipient state of rebellion much too often for good

health and comfort, but you must have their help.

I have known fruit-growers who in first commencing the business, had high ideals of just the sort of pickers they would have, and no others. But I have learned that it is neither wisdom or good policy, when a new applicant asks for a job, to require a certificate of character or his family genealogy. At our place, I have seen the times when the old de'el himself (as Burns would say) could have employment, just so he did his work well. I presume some of you have had occasion to divide your pickers into two or three squads for more effective work. Did you find it easy to do? I never did. The reason seems to be that each one soon learns which are the best patches, and he is fearful that he may not be "in it." My remedy is to so work each squad, that as the days go by, each one will get its just share. I have had much trouble with what I call tramp pickers. These are generally your well-meaning neighbors and acquaintances from ten miles around, who come in unheralded at their convenience and your inconvenience, to pick for fruit. that is to say they take fruit for pay instead of cash. Just when you would like to have them, they don't come, and when you have just work enough for your regular pickers they are sure to be on hand, and perhaps reinforced by more or less entire (I shouldn't dare say these things if any of them were present.) I am still waiting for a solution. Once in a while a picker (and strange to say, usually a woman) wants to run things, and she generally does—in a way. Take a woman with a sharp upturned nose, a thin pointed chin, and no particular development of the organs of higher celebration, and forty or fifty years of a varied experience to back her, it requires some courage and lots of tact to hold your own.

I have been often asked whom I prefer as pickers, men or women. As between men and women, I have no choice, but as between boys and girls, I prefer the latter. We live close to the Cedar River, and in the hot summer days the boys like to slip away to fish and swim, and to have a good time generally. And if Barnum and Bailey, or Ringling Brothers, or any other aggregation, great or small, comes along the "crack of doom" would not hold them in line, no difference how pressing or essential the work to be done. Girls are more reliable and dependable. They are as a rule neater, defter, and more careful in their work, and much more decorous in behavior. Do not, however, for a moment think that there is no good among the boys. There are many of them number one pickers, and in every way among the best and most trusty and worthy.

The storms which come with the advent of warm weather are

always regarded with fear and apprehension by the pickers. This may be due in part to the fact that they are away from home and its environments. But who can look with complacency upon the approach of one of these black demons which in a moment may desolate the earth and "all which it inherits?" Once upon a time one calm and sultry morning in June, just at the close of the strawberry season, we were out early to clean up several unfinished patches preparatory to commencing the raspberries. In my hurry and attention to business, I had not noticed a storm cloud rising low down in the extreme southwestern horizon, dark and somber, and ever increasing in width as it swept northward. The pickers, ever on the alert, however. had seen it and called my attention to it. I encouraged them to work on, saying, half in jest, half in earnest, that our country was large in extent, while our storms in comparison were very small indeed, and that this one would in all probability miss us. But I watched it, I fear, with illy-concealed anxiety. The pickers, nervous and restless, were on the verge of a panic, as though the "striped peril" of India's jungles, or the "yellow terror" of Africa's sandy wastes, was lying in nearby ambush ready to spring upon some helpless victim. The storm's advance until it had reached the altitude of 45 degrees seemed deliberate—and even hesitating at times, yet grand and impressive. I tried to convince myself that it was too early in the day for a veritable tornado, or cyclone. But in a moment all was changed. As I looked the edge of that dark mass, throughout its entire length, rolled up and from its hateful bosom there issued a cohort of green-colored clouds which rushed rapidly forward, like the skirmish line of a mighty army, sent out to clear the field of obstructions. In a voice hard and imperative, "To the tent! To the tent!" Here we gathered I shouted: breathless and terror-stricken. We were fortunate in having rising ground to windward, and the additional protection of a dense growth of young timber around us. Placing two or three of the largest and strongest to help hold in place each of the uprights which supported the ridge-pole, we waited for the onset which we knew must come.

The roar of the approaching storm was awful and sublime in its intensity. Then occurred a scene which one may never forget. Cries and lamentations rent the air. Some were praying to the Virgin Mary; some were devoutly crossing themselves, while others in the agony of despair with blanched faces awaited their impending doom in silence. As for myself, I bitterly reproached my almost criminal negligence in not providing an ample storm-cave for refuge and safety, and made a solemn vow—yea, many of them no doubt—that if saved, I would at once build that much-wished-for structure. But in a moment

this cataclysm of force and fury is upon us. Every voice, every cry, even the terrific peals of thunder are swallowed up and lost in the fearful strife of the warring elements. Now some Titanic arm reaches down and almost crushes our frail tenement out of shape and semblance. Anon, unseen hands with demonical strength are clutching and tugging and wrenching at every seam and corner for entrance. The tent sways and rocks as though cradled in the mighty aerial flood. We cease to note the lapse of time. Our heart-beats alone measure the lagging minutes. But in the midst of this direful extremity there comes a respite. Providence was kind and indulgent. Destiny had not yet balanced our accounts, and closed the book forever. In a very brief time, as measured by the dial and not our fears, that raging, hissing, howling, shricking monster of the upper deep had passed by, and disappeared. Hope, life, happiness returned with azure skies. In an hour or two under brilliant and glorious sun, in an atmosphere pure and invigorating, we were once more picking berries alike unmindful of our vows and prayers. It afterwards transpired that we were just on the edge of a tornado. A mile north of us scores of gigantic trees. uprooted and thrown down in promiscuous ruin, marked the central path of destruction.

No difference how long and how busy the day has been, the young people are ready for some sort of amusement. You, worn out with fatigue, may be longing for rest, but they hail the evening hours as the season of merry-making and pleasure. "Hide and Seek," "I Spy," "Dropping the Handkerchief," "Who Has the Button?" and other forfeit plays are favorites. Then again, perhaps, something more lively is introduced. Formed in a double line with hands of opposite partners clasped, they will swing around in a circle with shuffling steps to the rapturous singing of these inspiring couplets:

Kill-a-me-krankee is the song, And we'll dance it all along; From the heel unto the toe Kill-a-me-krankee, here we go. (Copyright reserved.)

Sometimes there are good speakers or declaimers who vary the exercises by rehearsing favorite selections; and they do it well. Even at the noon hour I have heard one of these elocutionists (always a young Miss) entertaining a circle of admiring listeners.

All the foregoing are not conducive to quiet evenings, yet we rather encourage them because, while at these games they are not at something more noisy or worse.

There are always good voices found among so many pickers,

and the owners are usually not averse to letting it be known. In the busiest hours of the day you may sometimes hear snatches of some song, or the humming of some refrain, and you soon come to learn who are the fortunate possessors of this divine gift.

Soprano largely predominates, and yet there are often good altos, and even basses, but tenor I have never heard. It is not strange that on rare occasions, an evening should be devoted to song. To be sure the selections are not from grand operas and oratorios of the great masters, yet for the most part, they are those gems of sentiment and melody which have touched the universal heart, and have achieved immortality and imperishable fame.

The goddess of song seems to love the "lone starry hours" in the "stilly night." At least I have never heard one of these concerts under the bright moonlight. And how decorous and orderly the performers and audience. Once in a while some street arab, forgetting the proprieties of the place and occasion, may attempt to sing "Where did you get that hat" or "Our Sally in the ally," but he is promptly squelched by being clapped down and out.

I recall one of these impromptu concerts with ever increasing pleasure as the years go by. It had been a strenuous day for us all. We had accomplished much, but it had been with great and persistent effort, and night, with its promise of blissful repose, was thrice welcome, but when youth and pleasure meet all else must wait. I had scarcely composed myself to woo "Nature's sweet restorer, balmy sleep," when I heard the field-boss (who on this occasion had assumed the role of master of ceremonies) call the first number of the program. I knew what was coming and in an instant was at the open window. In a rich boyish soprano voice with just enough Irish brogue in it to be irresistible, the performer thus began:

I'm thinking of Erin tonight,
And the little cot by the sea,
Where Jennie, my darling, now dwells,
The fairest and dearest to me.
I know that she waits for me day after day,
My heart ever longs to be there,
To meet her, my darling, my own,
Sweet Jennie, the flow'r of Kildare.
Chorus.
I know she's waiting for me,
My heart ever longs to be there,
To meet her, my darling, my own,
Sweet Jennie, the flow'r of Kildare.

At the conclusion the singer of Dumont's song was loudly applauded, as was every succeeding number.

Then a lassie sang:

Maxwelton braes are bonnie,
Where early fa's the dew,
And it's there that Annie Laurie
Gie'd me her promise true.
Chorus.

Gie'd me her promise true, Which ne'er forgot will be; And for bonnie Annie Laurie I'd lay me doune and dee.

Involuntarily my mind reverted to a touching incident which occurred during the Crimean war. On the eve before the assault on the Malakoff and Redan at Sevastopol, a soldier in the trenches began to sing Annie Laurie. His comrades took it up. It became contagious and gathering strength and force, a mighty wave of melody and enthusiasm swept through and over the entire British army.

One of Foster's beautiful plantation ballads, "My Old Kentucky Home," was next rendered with exquisite grace and ex-

pression:

The sun shines bright on my old Kentucky home;
'Tis summer, the darkies are gay;
The corn-top's ripe and the meadow's in the bloom,
While the birds make music all the day;
The young folks roll on the little cabin floor,
All merry, all happy, all bright;
By'n by hard times comes a knocking at the door,
Then my old Kentucky home, good-night!

Chorus.

Weep no more, my lady, Oh, weep no more today! We will sing one song for the old Kentucky home, For our old Kentucky home far away.

With one accord and with one impulse the audience all joined in the chorus, and it seemed to me that I could hear it

re-echoed from the very dome of the star-lit sky.

(Here there was a slight pause in the program. Possibly the scenery had to be changed, or more likely some of the gentlemen had to go out and see a man as they do between the acts in a theatrical performance.)

A serenade with guitar accompaniment was the next num-

ber:

O, the lone starry hours give me love,
When still is the beautiful night;
When the round laughing moon, love,
I see through the clouds silver white.
When no winds sweep through the woods, love,
And I gaze on the bright rising star;
When the world is a dream and asleep, love,
Then awake while I touch my guitar.
Till the red rosy morn grows bright, love,
Away o'er the far distant sea,

Till the stars cease their gentle light, love,
Will I wait for a welcome from thee;
And, O, if that pleasure is mine, love,
We will wander together afar,
My heart shall be thine, thine, my love,
Then awake while I touch my guitar.

In the long ago, I once again a boy with boon companions, am serenading our lady-loves. Oh! how those memories soften the heart and stay the flood of years.

George Cooper's "Genevieve" was the supreme effort of the

evening:

O, Genevieve, I'd give the world
To live again the lovely past!
The rose of youth was dew-impearled,
But now it withers in the blast.
I see thy face in ev'ry dream,
My waking thoughts are full of thee;
Thy glance is in the starry beam,
That falls along the summer sea.

Chorus.
O, Genevieve, sweet Genevieve,
The days may come, the days may go,
But still the hands of mem'ry weave
The blissful dreams of long ago.

The wail of despair for lost love and hope as portrayed by the singer haunted me for days. That voice should have been in some operatic troupe instead of among a lot of berry pickers.

A duet, soprano and alto, concluded the program:

Good-night, my love, the hour is late, The moon shines bright on silv'ry lake, And in my dreams, I oft repeat, Good-night, my love, my love, good-night.

The concert was over. O, blessed happy golden days of youth. Who would rob them of a single pleasure, or throw a single shadow across the future. Touched and mellowed by the muse's magic skill, I then and there granted full and complete absolution for all past offenses and shortcomings. But for me sleep had fled. Out of the darkness would come the fair, sweet face of "Jennie, the Pride of Kildare," or I would in imagination hear the inspiring strains of those grand old melodies, "Annie Laurie" and "My Old Kentucky Home." Then again I would hear that tender refrain:

O, if that pleasure is mine, love,
We will wander together afar;
My heart shall be thine, thine, my love,
Then awake while I touch my guitar.

Or I would hear that sad wail for the lost love of Genevieve, and it was far into the "we sma" hours before I could say:

Good-night, my love, my love, good-night.

SOME STRAWBERRY HISTORY.

Botanists have named more than 100 species of strawberries, but for ordinary purposes, they can be classed in three groups, one native of the Orient, one in Europe and the other in America. The Asiatic group has yellow flowers and insipid fruit. It has not received much favor from European gardeners, except for decorative purposes. We have grown it under glass for a number of years, simply for the sake of variety. The European group carries its fruit above the foliage and is less acid than those from the Occident. The American group is also variable as are those of Asia and Europe, and the western form has larger flowers with less acid in the fruit. The American strawberry appears to have been introduced to European growers a few years after the settlement at Jamestown, probably about 1620, and because it was introduced from Virginia received the name "Virginiana." The western form was not known in Europe until nearly one hundred years later. It is supposed to have been brought from Mexico or South America. Credit is usually given Chili, which name is often applied to it as well as "Fragaria grandiflora." This species is also found on our west coast.

It is probably true that the American strawberry has been the chief factor in the evolution of the garden strawberry as we know it at the present time, but we are inclined to believe that too much credit has been given to the large flowering sort, "grandifora," and not enough to "Virginiana." We have said this much to emphasize the fact that the berry which will give the best satisfaction to growers in the Mississippi Valley will contain a large proportion of the "Virginiana" blood in its makeup, if such a word is permissible in plant heredity.

The first notable seedling in this country was raised by Mr. Hovey and showed a marked improvement over the varieties grown in this country at that time. This seedling berry fruited for the first time in 1835. The berry was as large or nearly as large as any grown now, measuring 51/2 inches in circumference, according to the originator's description of it. Knight, Keens, Myatt and other growers of Europe had been busy raising seedling strawberries for some time prior to the one originated by Mr. Hovey. Keens' seedling was possibly the most noted strawberry before the introduction of the Hovey seedling. The next was McAvoy's Superior, which was awarded the \$100.00 prize offered by the Cincinnati Horticultural Society in 1851. This berry, however, did not have the staying qualities of the Hovey seedling, and soon disappeared from the trade. The next in importance, if not the most important berry was the Wilson. It originated at Albany, N. Y., and was introduced to the trade in 1857. This variety is still offered in plant catalogues. Another plant that has been in general cultivation for a long time is the "Crescent." This variety originated with Mr. Wm. Parmelee at New Haven, Conn., in 1868, and is still a popular variety. The introduction of the Wilson strawberry marked the beginning of commercial strawberry growing, as it possessed those peculiar qualities of standing up well after being picked, which made it a good shipping berry. The distinguishing characteristic of the "Crescent" is its productiveness under adverse conditions.

THE HONEY-LOCUST IN IOWA COUNTY.

F. O. HARRINGTON, WILLIAMSBURG.

(Read before the Iowa Park and Forestry Association.)

The Honey Locust (Gleditchia triocanthus) seems to be in its natural habitat in all the low lying land along streams, wherever other kinds of timber are growing, though not as abundantly as many others, throughout our county. I have not studied up the scope of its distribution throughout the state, but would judge that it is not plentiful throughout the west and northwest, if indeed it exists at all in some portions. While, as I have stated, its natural habitat is in the moist soils, yet it seems to very readily adapt itself to almost any situation, or soil, where a seed may be dropped by chance, or by the care of man, and they are quite frequently to be found along hedge rows, or timber plantings over our prairies between water courses. I have thought that the seeds were dropped by birds, for I find them coming up under my orchard trees, along with oaks, elms, red cedar, and some others, all unquestionably dropped by birds, though why a bird would attempt to satisfy hunger upon the seed of the Honey Locust without having the ability to first use a good hammer to crush them, is more than I can understand. So hard indeed are these seeds that the best way to fit them for germinating is to pour boiling water over them, let stand twenty-four hours, pour off the water, and repeat. After about the third scalding, an occasional seed will begin to swell. These should be sorted out and hot water treatment continued, and this kept up until all the seeds yield their stubborn natures, and are ready for instant planting. Nature's method of stratification and freezing may start the seed into growth during the spring, if the moisture conditions during the winter are favorable to have the freezing effective. Failing in this they are apt to go over one, maybe two seasons more before germinating.

The Honey-Locust is a rapid grower on the moist soils, soon making quite a dense grove. It will also make an effective barrier against all large stock, provided the seeds are obtained from the most thorny trees. I well remember an experience of my own in this line. I gathered a lot of seed under two tall trees in heavy bottom timber, planted them in spring after "boiling," let grow thickly in nursery row along a roadside, one foot apart. In three years I had a magnificent hedge, but almost totally without thorns and to this day remain so, the reason being that the original trees were practically thornless. urally as a fence it had no value, but was allowed to grow as a willow row would do, as shade for stock within the enclosed pasture. Some years later this row was cut out except a tree every ten to twelve feet. In this way it makes a very pleasing row of shade trees, laughs at either winter or summer storms alike, are not amenable to the ills of fungi, nor to the depredations of the hosts of insect life of whatsoever nature, unless indeed it might be that San Jose scale might bring it under subjection. But I would greatly desire that this insidious foe of both forester and orchardist fail ever to find such a place as Iowa.

However, in these days of barbed and woven wire fences, with high-priced labor and high-priced land, the doom of live fences has been sealed, thus shutting one avenue of usefulness for the Honey-Locust.

Another little experience I had with Honey-Locust was the purchase and planting of a thousand one year seedlings from a nursery, into grove, about the distance apart of corn planted in the fields. In this case it would have been a desideratum greatly to my liking had they proved thornless also, but they, on the contrary, proved, many of them, to be as bristly with barbs as the "fretful porcupine," and I firmly believe that with some of them no living animal much larger than a mouse could successfully scale them. Many others were afterward cut for firewood and posts, and despite care and leather gloves in handling, left many a wretched sting and sore, for the thorns are quite poisonous, as with the black locust. While nothing was mentioned as to the trend of an article on the honey-locust in Iowa county. I suspect that the question of economic value was uppermost in the mind of our worthy secretary when he made the request. So I will give the result of my observations, beginning with the first tree of considerable size that I cut down, and in doing so chipped out considerable pieces from a good ax in its iron like frozen wood. Nor was that the last time of such an occurrence in frozen locust. I found that the body posts split

from large trees and well seasoned were pretty good posts, and this would apply equally, but perhaps not quite so strongly, to walnut. But I found long afterwards that posts made out of young trees of either locust or walnut, six, eight or twelve inches through, although they were dried and sometimes charred well besides, were short-lived posts, and I believe good posts of the white or gray willow are about equal to either of them, certainly so with the walnut, and similar posts. Hardy catalpa I consider much their superior, and are much more easily and quickly grown.

Honey locust affords fairly good firewood when dried, but is unsatisfactory in the green state, and the good women of the home do not like the sharp thorn that occasionally obtrudes its notice upon them somewhat unceremoniously. I have never had any honey locust sawed into lumber, but incline to the opinion that it would make excellent lumber for many purposes, being very strong and exceedingly heavy, heavier than any other wood growing in our state, excepting possibly the osage orange, or at least any others that have come under my observation, and it should also be very durable where exposed to the weather or to dampness, as in some of our farm outbuildings. I do not know any reason why its lumber would not possess great excellence for making furniture of all kinds, for it would be strong and durable, is subject to a fine polish, or finish in oils and varnish, both in color and in its graining.

THE WHITE OAK.

The White Oak (Quercus alba) ranks second in distribution among the oaks of the state. The Burr Oak is the most widely distributed of any of the fifteen varieties represented in the native flora of the state. It is rarely found west of a line drawn through Winnebago and Harrison counties, and grows in sheltered locations, usually in valleys between hills and bluffs, westward. Eastward it grows on upland ridges as well as in the lowlands. It is one of the large and valuable trees of the state. The bark of the trunk and branches has a grayish tint. leaves remain on the tree until late in fall, when they add a deep red color to the autumn landscape. The wood is used for many purposes, though it is not as durable in contact with soil as the Burr Oak. It is, however, used for railway ties and posts. White Oak lumber is in demand at factories for making agricultural implements, furniture and cabinet work, as well as interior finishing of buildings, and for cooperage.

The White Oak is an annually fruiting variety, but does



WHITE OAK, (Quercus alba). Photograph by B. Shimek.

not bear a large crop of acorns. Oaks do not transplant easily, but if given proper attention in the nursery, they can be moved and a large percentage of them will grow. It deserves more attention than it has received.

THE SHINGLE OAK.

The Shingle Oak (Quercus imbricaria), also known as Laurel Oak, is a beautiful oak and is found in the native forests only in the southeastern part of the state. A line drawn through Muscatine and Taylor counties would probably determine its northwestern limit. Its leaves are larger, entire, dark green and resemble somewhat a large Laurel leaf. They take on a deep rich crimson color in the autumn. The wood splits readily into shakes or clapboards, and was used for shingles by the early settlers along the Ohio river, and in Missouri and Arkansas, hence the name Shingle Oak. The tree is pyramidal in growth, and somewhat resembles the Pin Oak and has nearly the same distribution, though it is not as common in the state as that variety, it is easily distinguished from it by the shape and color of its leaves. The wood, however, is used for the same purpose and the tree cross-breeds with species of the Black Oak family. The acorns require two years to complete their growth and ripen.

The other members of the group which require more than one year to ripen their acorns are, Red, Yellow, Scarlet, Water, Swamp, Schenck's and Hill's Oak. Oaks are the durable trees of the state. Their rugged growth appeals to most people. They live a long time, and when you plant an oak you are planting

for posterity as well as for the present generation.

Oaks, when properly located, grow much faster than most people think they do. Some specimens of the Pin Oak that have come under my observation have grown as rapidly as the Soft Maple, and this variety is one of the easiest to transplant. It is possible that the Shingle Oak can be grown as an ornamental tree, farther north and west than its present habitat, if given proper attention as to location and soil. Why not plant more of them in parks and pleasure grounds so the people may learn to appreciate them more highly?



SHINGLE OAK, (Quercus imbricaria).

Photograph by B. Shimek.

The Editor's Page

IOWA HORTICULTURE will be devoted to the study of plant life. It does not expect to explain all the mysteries connected with vegetable phenomena, for they are many; it does, however, hope it may be able to explain some of the common maladies with which plants are afflicted, and to prescribe such treatment as will restore them to health.

It will be Horticultural, in the broadest meaning of that word. The boundary lines of its garden will be the Mississippi river on the east, the Missouri and Big Sioux rivers on the west, the south lines of Minnesota on the north, and the north line of Missouri on the south, and any plant found growing in this garden is eligible to space on its pages.

It hopes to be what its name implies, a local garden paper.

PATIENT READER, some of the thoughts we write on this page will appear like plants that have been torn from the earth; none of their broken or straggling branches have been cut off, nor their lacerated roots pruned, or the soil shaken from them; perchance if planted again in good ground they may bear fragrant flowers and luscious fruit; but some of them will be like old roots and knotty branches that have been gathered from the hillside to feed the fire through the long winter evenings to keep out the cold of discontent. And as we sit with our feet on the fender and watch them burn we may get a little heat from the ruddy, glowing tongues of flame they emit. Should any of these gnarled fagots interest you we can not take them from the fire because they smoke so as to cause the eyes to smart and obscure the view, or they are so burned that only the black charred outline of their form is left, or their fiber may be so consumed by the heat that when touched they fall upon the hearthstone in a heap of gray ashes.

THE farmer lives very near the sources of life and trade; were it not for his skill in bringing forth the products of the soil, cities could not have been built or a higher civilization been attainable.

We can easily conceive how it was in the early history of the

race. Men wandered in small tribes from place to place in quest of food, living on herbs, roots, seeds and such fruits as they found, or on the flesh of wild animals; but when the light of civilization began to dawn they commenced to cultivate plants and to care for animals that were of most use to them. When the supply of any article of food was greater than needed for immediate consumption, they would exchange it for another that they did not have. Traffic increased, and men gave special attention to barter, then the merchant was born. Their stock of goods increased, store-houses were built to enclose and protect it from the elements and the unscrupulous hands of covetousness. From such a simple beginning has the commerce of the world been developed.

. . .

THE seller crieth, "It is cheap; it is cheap!" But the buyer saith, "It is naught; it is naught!" It has ever been thus. Still the great beams of trade swing up and down as merchants place their offerings of exchange on the scale-pans.

. . .

If anything appears on the pages of this bulletin that is inimical to the interests of the producer, jump on it with both feet. Don't be alarmed if it is a tender plant that some one has been trying to coax into life for some time. If a good thing, it will not be killed by such usage. When the farmer sets out tender plants he treads the soil around them that their roots may take a firmer hold on the earth. He occasionally steps on a plant, but that does not kill it. Did you ever see him take a harrow and drive athwart his fields of corn? It looks as though it would tear every plant from the ground, but only the weeds are killed. It is his brusk way of doing things that frightened you.

An idea that won't endure the rough harrowing of adverse criticism is not worth the space it occupies in the field of thought. It is a weed that should be harrowed out.

. . .

PEOPLE once entertained the idea that the earth was flat and immovable, and that if it was round and would turn over, that they would fall off from the underside, but Nature has been going on in the same old way; we think differently about it now. Our notions, though they may seem reasonable to us now, may appear quite antiquated in the sweet bye-and-bye.

Ideas change. We no longer believe in that close identity in form of individuals of the same species now, that we did years ago. If a grain of wheat could express its knowledge of rela-

tionship to its fellow-grains in the same head, I have no doubt it would be able to recognize its companions even though they were in an elevator with more than a thousand bushels of wheat. Do we have any difficulty in recognizing an old acquaintance in a crowd of one hundred thousand?

There is no such thing as a perfect resemblance between any two plants of the same species, scientific definition notwithstanding. There is only a similarity between members of the same species.

There is one thought that we would impress on your minds at this time; it is that you impress yourselves on your gardens. How you can best do this we will try and make plan by an illustration. Not many years ago we had occasion to go to an exposition to study it as a work of art seen by electric light. The view was from a bridge with the lagoon in the foreground, on either side a border of green grass, parterres of bright colored foliage, blooming plants and clinging vines, the great white buildings in the background crowned with circlets of light which brought out distinctly their outline against the sky, while darkness concealed all that was imperfect and crude in these structures, the music from the auditorium and grand plaza mingled with songs of the gondoliers or the plaintive voice of some sweet singer from the pleasure boats, the merry laugh from gay groups of pleasure seekers as they wandered from place to place, all made a beautiful, realistic revelation to the senses of the beholder of the dream of the architect who planned the exposition grounds and buildings.

It was the gardener and builder who materialized that dream so that thousands of people might enjoy it. It was simply thought materialized that had transformed a vacant piece of ground into a beautiful picture.

Now that is what I would have you do with your gardens. The sculptor sees in every block of granite a statue waiting the touch of his chisel and mallet to remove the rock which hides it from view. The gardener sees in every piece of ground a beautiful garden that needs only the touch of his skillful hands that others may see the flowers and smell their fragrance.

Before we can have fine gardens on our farms we must have beautiful gardens in our minds.

"Not from lowly earth to vaulted sky we gain at a bound, But slowly up the ladder we must climb round by round."

HARDY PERENNIAL PLANTS FOR BEDDING AND CUT FLOWERS.

G. A. HEYNE, DUBUQUE.

(Read before the Society of Iowa Florists.)

This class of plants is coming in for its share of appreciation by both the wholesale and retail florists, and certainly with the general public. Would advise that every retail florist plant at least a dozen sorts of each for cutting and bedding, where your customers can see them to make their selections for planting, and also to help sell them as cut-flowers. Of course the stock proper may or should be planted where there is plenty of room for them to properly develop and be kept free of weeds. I do not know of any class of plants outdoors that will with the small amount of care give as good returns for the ground occupied.

The list of sorts suited for cut-flowers is about one-third of all the commercially grown varieties. For bedding purposes there are at least half the list available; I mean those that will transplant easily. In bedding the possibilities of arrangement for best effects are beyond mention. Regarding the soil requirements of these plants, three-fourths will grow in good garden soil. While many recommend the planting of a mixed lot for continuous effect, it is certain that massing of some few kinds will give a more showy effect and also allow for some nice color schemes that could not be had with mixed up plantings.

It also helps keep the stock more pure for sale.

For a few minutes let us go over a small garden, and note some of the most showy ones, all easily grown. See the rose colored buds of the moss-pink on the terrace, this phlox is very fine for covering graves. Blue bells (Mertensia virginica), with changing colors of blue and pink bells, make a hue border for hardy candy-tufts with their knots of white buds ready to open when May has a few warm days. At the foot of yonder rockery are the Gold-tufts (Alyssum saxtile), a patch of about twenty plants laid out like a large blanket of gold; a ten cent packet of seed will give several lots like this bright spot. The tufted pansy or violets make a show to repay for the care of covering they received last fall. In May things have more of a height, though Iris pumila, on the knoll, is about the showiest now. The German iris with is broad clumps is showing a mass of buds that are useful for cutting, especially the lighter sorts.

Pæonies of the mutabilis, or officinalis type are out, both pink and crimson; this is a flower coming at a time (Decoration Day) when it is twice welcome, when the season is late.

The Chinese pæonies come next in season. There is a clump

of *P. fragrans* with its large pink flowers, blooming as regular as clock work. Of this class every florist that sells his own grown products should plant heavily. The selection of sorts deserves being treated as a separate subject; now is the time to plant.

August is the time to plant Oriental poppies; try a clump of a dozen plants. To make a fine yellow scheme, plant *Heliopsis pitcheriana* in background, *Gaillardia grandiflora* in middle, and *Coreopsis lanceolata* around edge. The last are all fine for cutting.

If more height is wanted add several clumps of Golden Glow Rudbeckia; they certainly grow anywhere and will give flowers by the armful. Achilla—the Pear—is a most useful plant for cutting; it makes better plants if divided every two years. Gypsophila paniculata is indispensable as a cut-flower. Hardy phloxes of the newer sorts make a fine display, and should be planted liberally; best time is spring as the shoots appear above ground; give them plenty of room between rows. Spring propagation of stock gives later bloom.

The Hollyhocks are showing more resistance lately to that dreaded disease. A hardy border is scarcely complete without hollyhocks in it; the single sorts hold up better than the doubles.

Foxgloves must not be forgotten. They are very stately in the hardy border. It is advisable to winter some stock inside or at least give the protection of a cold frame. Would also recommend this for the following: Bellis perennis, Primula vulgaris, Campanulas, Scabiosas, Tritomas, Snapdragons, Forget-me-nots and Hollyhocks. This applies to young stock in particular.

Regarding lilies my experience has thoroughly convinced me of the unusual chances of blooming some of the sorts offered every year. All told, about a half dozen will repay any care. Would class about this way: Lilium candidum and Speciosum album for white; Roseum and Rubrum for colored, and Auratum for spotted; of course including Tigridum single and double as ironclads, the last two can not be beaten for hardiness. Of some sorts like Pardalium, Umbelatum or Parryii, the chances are one in two, or morse, the commercial florist will get no returns worth mentioning out of the other sorts offered.

The following is a list of hardy perennials most useful for cut-flowers. There are a few other sorts that might be men-

tioned, but those listed will give best results.

Achillea the Pearl, Asclepias, Asters (hardy, late), Bellis, Chrysanthemum (both summer and late sorts), Clematis paniculata and Recta, Convallaria, Acquilegia, Gaillardia, Coreopsis, Gypsophila, Helianthus, Heliopsis, Iberis, Iris (German and kæmpferii), Liliums, Lychnis, Pæonies, Phloxes (hardy), Py-

retheum, Rudbeckias, Spireas, Solidagos, Wall-flowers, Valerians, etc.

With those above, recommend the following for massing and bedding, also for specimen clumps:

Alyssum.

Anthericum in variety.

Aquilegia.

Anemones.
Artemesia in variety.

Astilbe.

Bocconia in variety.

Boltonias. Caryopteris. Campanula.

Centaurea. Clematis.

Delphiniums. Dianthus.

Dictamnus in variety.

Dielytra.
Digitalis.
Funkias.

Hemerocalis in variety.

Hepaticas.

Hollyhocks in variety. Hypericum in variety.

Iris. Lobelias. Linum.

Pentstemem. Plumbago. Primulas. Salvias. Santolinas.

Saxifraga. Sedum. Spireas.

Tritomas. Vincas. Violas. Yuccas.

GREENHOUSE GUTTERS AND POSTS.

J. A. KRAMER, CEDAR RAPIDS.

(Read before the Society of Iowa Florists.)

The stability of any structure depends first on the foundation. Posts, the true foundation in greenhouse construction, should have the elements of strength and durability.

Wood is the most common, and I might say the most unsatisfactory material used, owing to decay by excessive changes of heat and moisture. The last qualities may be improved by a coat of tar, paint or oil, or better still set the post in cement, care being taken to have same extend a few inches above the soil and rounded off so that water will not accumulate around the posts. Of the different varieties of wood used, red cedar is found to be the most satisfactory. Another objection to wood is large size, which reduces the amount of light.

To meet the increasing demand for better material, iron was introduced and has proven very satisfactory, so much so that iron posts are now almost exclusively used in modern upto-date constructions. The posts should always be set in cement the same as recommended for wood. A cast iron base may

be used, though not necessary if care is taken in setting posts as recommended.

Another material used for posts is cement. This so far as lasting qualities are concerned cannot be excelled. Strength can also be obtained by re-enforcing with iron, but why add cement to the iron above ground at the expense of light?

Gutters in connected houses are an absolute necessity, but for various reasons would not recommend their use in disconnected or on the outside walls of connected houses. They may be made either of wood, iron or cement. Wood is the most common, in fact the only material used until recent years. The constant expansion and contraction caused by the changing conditions of heat and moisture soon start decay, loosen the joints and render the gutter unfit for one of the uses for which it was made. Thorough painting is beneficial, but not lasting. Again, wood being a non-conductor of heat, does not absorb sufficient heat from within the house to keep the gutter free from snow and ice during cold weather.

In connected houses gutters usually serve a three-fold purpose. Being used as a conductor of water, a walk in which to work in making repairs and for sills or the frame work on which to build the roof. Great strength is therefore required as in all methods of construction, with one or two exceptions, the gutter is compelled to carry the entire weight and strain of the roof, and in order to do this with the use of wood large dimensions are required, which is at the expense of light.

In order to overcome the objections made to wood, iron is now largely used and with great success. It being a conductor of heat, absorbs sufficient from within the house to keep the gutter free from snow and ice in the coldest weather. An objection is made to iron on account of the condensation which forms on the inside. This, however, is overcome by the use of an auxiliary gutter, or what might be called a drip conductor, which is placed beneath the gutter proper.

For strength we have in iron either for posts or gutters the maximum with the minimum size part for part, which admits of more light than any other construction. There are many styles or makes of iron gutters, all of which have more or less good points. Where strength is not needed for the support of the roof a very thin galvanized sheet iron may be used. In this case all that is necessary is iron of sufficient strength to use for a walk in making repairs.

In constructions of this kind brackets are used on the posts; a connecting purlin running a few inches from and parallel with the gutter, forms the frame work to which the bars or roof is attached. The gutter is attached to the bars as in other

constructions, but does not in any way carry any of the weight or strain of the building.

The use of cement for gutters is comparatively limited. Lasting quality is about the only redeeming feature.

TRUMPET CREEPER.

The Trumpet Creeper (Tecoma radicans) is native to South-eastern Iowa, growing in low rich soil, in heavily wooded districts. It is thoroughly hardy as far north as Davenport. It is an excellent vine to cover old walls or trunks of trees that have been pruned high. It climbs by rootlets. It blooms freely for several months, in terminal clusters. Its large orange-red flowers are a favorite resort of the Ruby-throated Humming-bird, and it probes them with considerable satisfaction for insects or nectar.

This vine should be used freely in decorative work.



TRUMPET CREEPER, (Tecoma radicans).
On an old limekiln.

Photograph by B. Shimek.

NATIVE FRUITS.

E. M. REEVES, WAVERLY.

We have progressed far enough in our experience as a state to know and predict very closely the value, present and prospective, of each of the fruits found native in the state. Some have and are receiving a good degree of attention, while others might be made valuable by the proper attention of some horticulturist.

Iowa was not barren of fruits when first settled, as seems to be the general impression, but was supplied with a list of such variety that whoever gave the proper attention to the matter had a generous supply that added much to the enjoyment of pioneer life.

All old settlers remember the fine quality of the wild strawberries. They were abundant but small, and while in an early day they filled the place well it is doubtful if they are necessary in our list of the present day, for even with their fine quality they could not surpass in that respect the best of our cultivated sorts and are too small to be of use. Farther north, where hardiness is a prime consideration and the present list fails, they may be of value.

Raspberries, both black and red, grew in abundance, and of a size and quality that would make our present varieties look well to their laurels. On these we have not improved as we might, and better and hardier sorts are in demand. Experimenters should take up these fruits in a systematic way, and give us better varieties. With the blackberry we have varieties that are large and delicious, but they are not hardy enough, and the prospect of a wonderful increase in size should encourage the experimenter.

Native plums are and have been receiving some attention, and while many of the best were lost, we have a list that is encouraging and a limit in size and quality hardly to be conceived. With this fruit the crossing with foreign sorts furnishes an interesting field for the experimenter, although at present I know of no crosses of desirable value. Of the many varieties now in cultivation, but few approach the desired quality, and are all much smaller than a perfect variety should be.

Our wild apple was extensively used before orchards of the introduced varieties came into bearing, but at present it is regarded as of little value, and even in crossing it with the eastern sorts has little in quality and nothing in hardiness to commend it, but in beauty and fragrance of bloom it has no competitors among the fruits.

Of cherries, we have three native species. Of these neither

seems at present to offer much to encourage the experimenter, as all are of fixed type that cultivation has little effect in the improvement of the fruit, and so far have shown no crosses. However, the wild black cherry is worthy of a place on every farm. The trees are easily grown from seed, are hardy, vigorous and productive of fruit readily eaten from the hand, although of no culinary value. The fruits on different trees will give a supply for at least two months.

The wild black current is of no value when cultivated, while the smooth varieties of the gooseberry have a value not at all appreciated. Whoever will introduce an improved type of this

fruit will not have lived in vain.

Juneberries are also a valuable addition to the list of native fruits, and when once planted, increase in productiveness with age. While good alone, the fruit is of most value when mixed with currants or gooseberries.

The black haw seems to respond to cultivation and might well be included in the list, more as a novelty than as one of real

value.

The thorn apple offers a promising field for improvement. The fruit is so variable, the trees so productive and ornamental, that it should find a place in our gardens. The wild sorts are much larger than what is supposed to be the original of our apples, and being so variable, will certainly respond to good care, and who can foretell what time might bring forth from this fruit?

There are also the mulberries of which improved sorts are already common, but not enough. The grape has perhaps received more attention than any other native fruit in the way of improvement, and our present list is pretty much all that could be desired. If specially hardy ones are desired, there are varieties not so far removed from the original as others that in vigor and hardiness leave but little to wish for, and which produce fairly good fruit. Of these the Oporta is a good example.

Early settlers made much of the fruit of the elderberry. It is still enjoyed and is hardy and productive, and varies much in size and quality. It likes a moist but sandy location near the edge of the water, but will thrive anywhere. By care this might be made a valuable fruit, but like the mulberry it is apt to become a nuisance, as the birds scatter the seeds and so start plants

in every nook and corner.

In the viburnum family the black haw has already been mentioned. In addition to this, the sheer berry is of interest as a pretty shrub, both in bloom and fruit, while the high-bush cranberry has already been developed into a valuable fruit, some varieties being especially fine for marmalade and will fill the place of the swamp cranberry, although in no way re-

lated to it. While the high-bush cranberry is now found wild in many places, the changes wrought by man can be readily seen by comparing the bloom of the common snowball, which is usually sterile, with the bloom and fruit of the high-bush cranberry, both being developed from the same source.

Our native nuts might also be included in this list, especially the black and white walnuts, shell-bark hickory and hazelnut, all of which are inclined to variation and so might be greatly

improved by care and selection.

In looking over this list we are struck with wonder at the heritage Iowa has for her inhabitants, and express the hope that all possible lines of experiment will be followed up and leave no stone unturned to develop nature's gifts to their greatest possibilities.

CURRANT.

WM. A. ANDERSON, WEST UNION. (Read before Northeastern Society.)

The currant has been neglected of late years, probably on account of the ravages of the currant worm. I can remember, when a boy, that the currant was the only small fruit grown to any extent. People would have a garden fenced with a picket fence, and have currant bushes planted along the fence, so that when they drove in with the manure, the bushes would not be in their road.

Manure was generally thrown about the bushes once or twice a year, and the soil spaded up, as was very often done in making the early garden, and the manure was thereby worked into the soil, and the result was the bushes bore abundantly, but that was when people did things on a smaller scale, and when there was plenty of help at home, but after the old picket fence played out, and when help began to get scarcer, and then the currant worm began its mischief, the currant then began to be neglected, and as a consequence at the present time there is quite a demand for currants in the market.

I must confess that for myself, I do not care so very much for the fruit, but when fully ripe to eat out of hand, or with sugar on, on the table, they are quite delicious, and for jelly

they are unexcelled.

The red currants are generally more acid than the white,

but are in greater demand.

Currants are very easily propagated from cuttings, which may be made in the fall, planted at once, and covered with a mulch to keep them from heaving in the spring, or they may be tied in bundles and either buried outside or put in the cellar

where they will keep moist until planting time. They may be made in the spring and planted at once. It is well to make the cuttings of good length, from eight to twelve inches of new wood, leaving two or three inches above ground in planting.

I have not tried many varieties, but the following are good: White Grape, large, light colored, mild, acid, good yielder. White Dutch, not as large as the above, and rather a lighter color, good bearer. Red Dutch, red, not very large berry bushes, quite good size and heavy bearer, fruit quite acid. Pomona, red, fruit and bunches medium size, heavy bearer, of mild flavor. Fay's Prolific, red, fruit very large, bunches only medium size, fair yielder. Red Cross, red, fruit large, showy, bunches medium size, bushes vigorous, fair yielder.

Where currants are grown in a commercial way, it would be well to plant them about three feet apart in the row, and the rows five feet apart, planting something else smaller every third or fourth row, that you could drive over in hauling manure

to the bushes, as they need manure and cultivation.

To keep the current worm in check spray with white hellebore or paris green.

VARIETIES OF APPLES FOR A COMMERCIAL ORCHARD IN SOUTHWESTERN IOWA.

The following is a list of apples and the proportion of each to plant in a commercial orchard, suggested by the following gentlemen:

- J. M. Bechtel: One-third Ben Davis, one-third Winesap, one-third Jonathan.
- D. B. McCalla: One-half Ben Davis, one-fourth Winesap, one-fourth Jonathan.
- N. C. Wragg: One-half Ben Davis, one-fourth Grimes, one-fourth Jonathan.
- W. S. Keeline: One-half Ben Davis, one-eighth Genet, one-eighth Grimes, one-fourth Jonathan.
- D. W. Lotspeitch: One-third Ben Davis, one-third Grimes, one-third Jonathan.
- James McGinnis: One-third Gano, one-third Grimes, one-third Jonathan.
- J. F. Record: Three-eighths Ben Davis, two-eighths Genet, two-eighths Grimes, one-eighth Jonathan.
- G. H. Van Houten: One-half Ben Davis, one-fourth Grimes, one-fourth Jonathan.
- D. L. Royer: One-half Gano, one-fourth Grimes, one-fourth Ben Davis.
- F. P. Spencer: One-third Gano, one-third Grimes, one-third Winesap.

POISON IVY.

Poison Ivy (Rhus radicans) is a widely distributed vine or shrub, growing in every part of the state. In moist rich ground it climbs up trees to a great height, attaching itself to the bark by numerous rootlets. On dry ground, where it grows without support, it is only a shrub a few feet high, often not more than 18 inches in height. It has three leaves to each petiole, which distinguish it from the Virginia Creeper. The fruit is white, while other sumacs have red berries.

On account of its poisonous properties this vine is not used in decorative work. Some people are not poisoned by it, while others can not touch it without suffering more or less discomfort, and sometimes considerable pain.

It is sometimes called Poison Oak. It is used in the treatment of diseases, especially rheumatism.



Poison Ivy, (Rhus radicans, or toxicodendron).

Photograph by B. Shimek.

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THE SWEET APPLE.

B. STUART, ALTOONA.

The sweet apple, although not usually a profitable apple to raise in large quantities, is quite a luxury in itself and no family orchard is complete without a few varieties.

For pickles and preserves it is unexcelled. Surely a nice sweet apple and cream can find a welcome place on any breakfast table, no matter how sumptuous. They also make excellent cider and among the various other missions of this neglected friend we find a good, ripe, sweet apple eaten from the hand quite a treat.

In planting sweet apples I would not advise planting too extensively, yet I would not think of planting an orchard without a few trees, such as Sweet June for early, Ramsdell and Baily Sweet for fall, and Sweet Paradise for winter. There are a great many more sweet apples, but these are my choice for a family orchard.

NOTES ON SOME OF THE NEWER APPLES.

PROF. E. E. LITTLE, AMES.

(Read before the Northwestern Society.)

In this brief discussion there will be mentioned one or two old varieties of apples in addition to those more recently introduced.

Where do these new varieties come from? It is remarkable that the history of many common varieties reveals the fact that they are chance seedlings (the parentage being unknown). There are thousands of chance seedlings which have been produced that have never been propagated because one or two essential qualities were lacking. Probably some of these seedlings were in season in October just at the time so many varieties ripen, or it was too acid for commercial purposes, or possibly it lacked in size but had all the other essentials of a good fruit. Doubtless if we would have been able to have used many of the discarded ones our list would be very suitable for parts of the country where apples are not grown successfully at the present time.

Instead of discarding these seedlings, they might be used for improvement by cross breeding with the standard varieties to produce some better fruit than we now have, and these seedlings may be found in almost every orchard and are being found. Already one of your members, Mr. L. A. Clemons of Storm Lake, has several seedlings of value on which many of the

standard varieties may be crossed with good results. New va-

rieties of great value can be produced in this way.

The SALOME originated in a nursery at Ottawa, Ill., and was first exhibited before the Illinois State Horticultural Society in 1878 and was introduced into this state about ten years later. The variety was pushed by the propagators and a great many trees were sold at one dollar each. It was a novelty of which so much is often said in regard to its merits and nothing about its defects. The State Horticultural Societies were very judicious in not endorsing it at first. They wished to see it make a name for itself. During the past season it has shown a fine record in parts of Northeastern Iowa, and from parts of Northwestern and Central Iowa have come good reports of it. The fruit will average of medium size, sometimes quite large, and when fully colored is very attractive. Tree is rather upright, round headed and makes a very symmetrical top. A handsome tree of medium size. The fruit is medium to large, quite uniform in shape; form roundish, slightly conic; color is pale yellow; surface mottled and striped with pinkish red and shaded with red and a grayish scarf skin at base toward the cavity; flesh is yellowish white, firm, tender, juicy, slightly sub-acid, good.

A seedling which is of Wisconsin origin is the WINDSOR or WINDSOR CHIEF, which is said by some to be affected somewhat by twig blight in the early life of the tree, but this seems to occur largely on the very heavy soils and after the trees attain size it gradually disappears. On the lighter soils the trouble does not seem to occur to any extent. This is a large apple which is rather attractive. It varies some in size, but will average above medium, of suitable size for commercial purposes. tree is a moderate grower, upright, rather wide spreading with medium sized branches. Apparently a very good tree. Fruit is medium or above in size, form oblate, sometimes slightly roundish oblate. A yellow ground almost entirely colored with deep red. Large russet dots appear over the surface; flesh moderately fine grained, sometimes coarse; yellow tinged with green, juicy, slightly sub-acid, sometimes nearly sweet with a slight aroma. of good quality. Will keep until late spring.

Delicious Apple originated in Madison county, Iowa, of unknown parentage, but thought to be a seedling of Yellow Belleflower, which it resembles in form, but very distinct in color. The variety is being tested and it is worthy of planting for trial in Northern Iowa. From some of the leading Pomologists who have tested this variety it is pronounced to be the very best in quality, and from specimens examined by the writer it was found to be fine in quality. Fruit will average as large as Yellow Belleflower and somewhat the form of this

APPLES 31

variety. Form is conic, ribbed at apex end; yellowish ground color overlaid with striped and mottled red and striped with crimson deepening to a purplish. The dots are large, whitish, conspicuous. Flesh is firm, somewhat tinged with yellow, medium to rather fine, tender, juicy, aromatic with slightly sub-acid flavor of best quality. Season late winter.

HUTCHINS' RED. This apple originated in Mills county, Iowa, where there is an old tree about thirty-five years of age which has been productive. It is a handsome, attractive fruit of medium size. It is probably a seedling of the Fameuse, having the characteristic flavor of seedlings of this variety. It is more oblate than this variety, of a solid red and not striped, rather uniform in size and some specimens resemble the Shiawassie Beauty in general appearance. It is undoubtedly of this type. The Fameuse and Canada Baldwin (a seedling of this variety) are grown in Northern Iowa, and doubtless many of you have grown them. It appears as though this seedling is of sufficient value to be planted for trial and would probably be valuable for a home or commercial orchard. It should be carefully tested before largely planted.

Okoboji, as most of the members of this society know, is being propagated by Mr. Antisdel and is a chance seedling from Filmore county, Minnesota. Its origin would indicate hardiness, one of the essential characteristics necessary for a valuable apple in this section. In 1905 the propagator reported it bore five barrels of apples and was in season from November to April. The tree, which was set in orchard in 1882, has never blighted and has not been injured by cold. Fruit is about the size of the old Haas and resembles this variety in form. The bright greenish surface is almost entirely covered with red stripes and splashes and when highly colored is rather attractive. The flesh is tender, juicy, flavor sub-acid and quality good.

Seevers. This is an old variety which has been grown in Southern and Central Iowa for a number of years and more recently in parts of Northern Iowa. It seems to be doing well wherever grown and account of its season is worthy of attention for planting in the home orchard. The tree is upright, slightly spreading, rather open. The branches are medium with slender twigs, with moderately abundant foliage which seems to stand drought and heat very well. The fruit will average the size of Willow Twig, but is not as broad at the apex, slightly conic in form. The color is yellow ground with a tinge of green blushed with bronze or light red. The dots are conspicuous russet with a reddish circle around them when approaching the stem end. Flesh is white, firm, tender, juicy, slightly sub-acid, quality good. Season January to April.

INGRAM. This is a seedling of the Ralls Genet. The fruit seems to color up more than its parent, but is inclined to run small when the crops are too heavy, having the fault of the Ralls in this respect. Probably of no value in this section. The fruit is yellowish or pale yellow, washed striped with two shades of red, specimens are medium to rather small with yellowish white flesh, juicy. Mild sub-acid of good quality. Season late spring.

ALLEN CHOICE. The variety has been found growing in parts of Northern Iowa where it is bearing good crops of small fruit. Fruit runs too small for commercial purposes, but for the home orchard would make a fine dessert fruit and possibly of value for local market as it keeps well. It is a small rather attractive apple about the size of a medium Ralls Genet. It colors more highly than Ralls, being good red; flesh is firm, rather juicy with a pleasant rather mild flavor; good quality; season January to April.

[&]quot;Good morning, Boss! Got any work I kin do today?"

[&]quot;What can you do?"

[&]quot;Most any kind of work, from choppin' wood to splittin' kindling. You see, Boss, I'm a gardener, and am expected to do most any kind of work, from grubbin' out trees to sowin' wheat, plowin' corn, plantin' taters, hoin' cabbage, weedin' onions, pickin' berries or makin' a gardin. I kin pull weeds out of the lawn or mow grass. If you haint nothin' else to do, I kin help the kids gather Johnny-jumpups or mushrooms in the woods, or pull the green scum out of the pond, or sit on a hot-bed as well as any perfessional tramp you ever saw. I's willin' to work most anywhere in this big gardin, even if I must tote the stuff to market. It won't cost you more than a dollar and I'll board myself. But I'll be drubbed before I'll feed the chickens, milk the cow or slop the pigs.

[&]quot;I'll be cummin' along this road every month and if you want me to give you a lift say so while I'm here. What do you say, Loss?

[&]quot;Thank you, Boss; much obliged."

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WESLEY GREENE, Secretary.

FEBRUARY 1908

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MONTHLY BULLETIN

OF

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DES MOINES, IOWA

IOWA HORTICULTURE

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IOWA HORTICULTURE

VOL. 1

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NO. 2

SOME DOORYARD POSSIBILITIES.

MISS ETHEL WALLER, CHARLES CITY.

Did you ever think that we live in a region which is comparatively destitute of flowers? I never did until a year ago when I made a trip to the Pacific coast. As we drove about the city of Vancouver, the wonder constantly grew in me that small yardscould produce so many flowers and that each householder shoulds be so keen in their cultivation. Every home seemed to thrust a wealth of floral beauty on the attention. No one could escape the impression of comfort, cheer and refinement that the flowerscreated.

Going on to the older, quieter and more truly English town of Victoria, we sought out the acknowledged points of interest to tourists—the stately parliament houses, the governor's mansion, a fine old castle, etc. But the buildings themselves failed to call from our party the cries of wonder and delight that the picturesque luxuriance of flowers, vines, shrubbery, and fine old trees did. Even in the heart of the city, the grimness of gray stone business blocks was relieved by window boxes from which fell mantles of delicate green drapery while bright geraniums beamed a cheerful greeting above. Many buildings of uncompromising plainness were rendered attractive by flower-filled and vine-wreathed balconies. "Beautiful! beautiful!" we kept ex-"How perfectly delightful it must be to live wherethe climate and soil make such effects possible!" The personal message was lost so far as I was concerned. Soil and climate as sole reasons for the marvelous difference in appearance of Charles City and Victoria satisfied me then. I know better now.

All of the American cities on the coast which I visited owed much of their charm to their flowers. The western people are more awake to the architectural beauty possible in even the smallest cottage. Their homes representing no more money than ours are in many cases far more pleasing because they express more individuality, or treatment in harmony with their surroundings; but the chief difference between the appearance of the western towns and ours seems to me to lie in their attitude towards nature. The westerners are so bent on making the most.

out of everybody and everything that they court nature not only as the giver of food, but as the gracious dispenser of beauty also. They study her whims and coax where they can not force her, and like any feminine being she yields to such treatment and rewards their patience richly. We have taken the position towards nature of one who says: "You are a niggard and will give only when your hand is forced open. Be as hard as you want to, we will make you give us a comfortable living, but further than that we will not strive. You can keep your luxuries for those you love better." We seemed to have settled into a state of passive indifference to the fact that our town is all sameness. from slight modifications in the houses, the streets look very much alike. The aim seems to have one grade throughout, parkings of one width, houses set back at a uniform distance, barns and outbuildings crowded as far back on the lot as possible, a smooth, closeshaven lawn, a row of shade trees along the parking and maybe a few scattered about on the lawn. If the street is well-paved, the lawn well-kept, the trees trimmed with precision, and the buildings nicely painted, the effect is perfect. The greatest good has been attained. Strangers are driven about the city and called upon to admire it as a "city of homes." It certainly merits admiration in so far as the aim has been secured, but isn't there a better aim possible! Doesn't it remind you of the polished "Spotless Town," famous in Sapolio ballad? Don't you fell rebellious at times as you notice that your surroundings are just like your neighbors on either hand? Doesn't your soul cry out with the joy of a released prisoner when you find yourself for a day in the woods? Can you sit on your porch exposed to the fullview of passersby and without envy turn over the pages of a book whose illustrations set before you retired, vineembowered cottages where privacy is possible out-of-doors amidst the sunlight and the flowers as well as within? Isn't there a corner of you memory where are lovingly, longingly cherished such pictures as that conjured up in "John Halifax" of Mrs. Todd's Rose Cottage? You remember Phineas' description of it. "It was well named. I never in my life had seen such a bush of bloom. They hung in clusters—those roses—a dozen in a group. pressing their pinky cheeks together in a mass of family fragrance, pushing in at the window, climbing up even to the There was yellow jasmine over the porch at one very attic. front door and a woodbine at the other; the cottage had two entrances, each distinct. But the general impression it gave both as to sight and scent was of roses—nothing but roses.

"But," you object, "such loveliness is impossible in our severe climate. Roses will not do well here." Well, I admit that the "Queen of Flowers" probably will not wave her scepter over our roofs in the immediate future, but few of us know what is ac-

tually possible in the line of rose-growing right here in Charles City. One summer I was in Battle Creek, Mich., during June and many times we formed parties to walk a mile and more over the river into a dingy district where lived the workers in the breakfast food factories. The attraction consisted of a brown cottage quite as unprepossessing as its neighbors except for one transforming feature—a Crimson Rambler rose glorified the whole front of the house with its prodigal bloom and shining foliage. What an influence it must have exercised in the neighborhood! The sermons of an eloquent preacher, the wealth of a philanthropist might fail to convey to the hearts of those workmen the message of God's love for every man and His power to change the commonplace into the beautiful that that rose bush did.

Ever since my first glimpse of that Crimson Rambler it has remained my ideal of what a rose should be and I am delighted to find that there are Crimson Ramblers in our own town which promises to vie with that one in size and beauty. Roses require intelligent care and it is our general lack of interest and ignorance as to their requirements that prevents successful rose-growing here rather than our trying climate. The fault lies mostly in us. If we remained as indifferent we might live in California and still have no roses on our grounds.

Distinction brings danger and the rose does not retain its supremacy among flowers without many a battle with insect enemies and disease. In these it needs human aid no matter what the climate. Gardeners are constantly at work seeking to perfect a rose for the north. The Japanese roses are the stock on which most of the experiments are made and Crimson Rambler is one of the results of these efforts. Undoubtedly other excellent roses will be secured in time. Meanwhile we have a large choice in form and color as to the roses we will grow. Our old friend, the General Jacqueminot, should serve as an introduction to many of the Hybrid Perpetual class whose powers to please and to endure are just as great. They run the whole gamut of color in red from the exquisitely delicate pink of Madame Gabriel Luizet to the rich velvety maroon of King Oscar of Sweden. And there are white ones also. The hybrid perpetuals are splendid roses and when you have once secured a start you can increase your stock by cuttings. One lady in this town has rooted thirty-five thrifty young plants this summer.

Aside from the hybrids there are very many perfectly hardy roses requiring on winter protection. Among these are several varieties of moss roses, the charming little Scotch roses, the dear old blush rose, and a large half-double pink rose that is the loveliest shade imaginable. Would you like to have roses? Give them love, study, and care and you can have them in any meas-

ure you desire in June. If they do last only a month or six weeks, they will repay you richly. Intensity of pleasure is heightened by its brief duration. Christmas would lose its fas-

cination if it came every day in the year.

Can you imagine the charm this town would gain if we developed many rose enthusiasts among us? Two people would scarcely choose the same roses or plant them in the same way and individuality in our home surroundings would become more apparent. The Dutch colony of Amana near Cedar Rapids has many surpassingly ugly features, but it is said to have more roses than any place east of Salt Lake City and visitors rave over its beauty in rose season.

But this is not to be a paper on roses. My object is to call to your attention to some of the plants, vines and shrubs that will greatly add to the pleasure you feel in your grounds and yet will require little care and will live from year to year gaining in beauty and vigor. Their choice, their arrangement, and their care will furnish a delightful study and an interest for every

member of the family.

To begin with garden in its root-meaning implies privacy and the question arises, "How may it be secured in town where the lots are so small? Shall we build high board fences to exclude the view?" Never was there a more aggravating thing done. It is like a slap in the face to the passer-by who follows the bare wall, catching through the gate a glimpse of forbidden loveliness within. It ruins the beauty of the town and severs one from the sympathy of his fellows who pass his home. The better plan is to have the house stand well to the front and side of the lot so that the side and back yards may be as large as possible, and then arrange trees and shrubbery and vines so as to screen the view of your garden without seeming to publish the fact, "Thus far shalt thou see and no farther." Your front porch may be quite near the walk and yet so overgrown with vines as to shield you from the public. Don't cut up your small front lawn with flower-beds or shrubs. Plant the latter well to the side or close to the house. Some shrubs seem to belong near the house anyway. What a humanizing, feminine touch a clump of lilacs at the corner of the house affords. Shrubs do better and are more effective when planted in a border or in well arranged groups than when isolated and the lawn gains in beauty by their removal, since patchwork effects are never desirable. The shrubs will give a beautiful background for such flowers as you choose to plant among them. Bright blossoms will also appear to advantage against the vines about your porch. It is here the cannas belong rather than out on the lawn, for their tall stems

repeat the vertical lines of the porch pillars and harmony is preserved.

What vines can be used with assurance of their hardiness? Climbing roses have been mentioned; the Virginia creeper is an old stand-by and yet not sufficiently appreciated. We read in English stories of ivy-mantled towers and I always longed for their picturesqueness, but when I saw English ivy growing luxuriantly it seemed to me no more beautiful than the Virginia creeper and then it never takes on the rich colors that make the latter so gorgeous in autumn. One porch in town has elicited much admiration this fall because of the combination it presented of Virginia creeper and bitter-sweet. The bright berries of the latter will linger for months to give pleasure. The end of another porch was completely covered from top to bottom last summer with purple clematis. There must have been hundreds of blossoms open at once. Another drew its charm from a fine wistaria vine. The wild clematis is a healthy and luxuriant vine, producing a wonderful profusion of pure white, deliciously fragrant flowers during late summer and fall.

There is a wild vine with large, round, dark green leaves that is excellent for porches and of course the wild grape vine makes a noble growth. The honeysuckle shows off brilliantly with its red blossoms. As a support for the vines, wire netting, suspended on hooks in the side of the house, may be used so that the vines can be readily removed when painting is necessary. There is no lack of hardy vines and by combining them very lovely results may be obtained. Our houses need not be bare and staring, but may be clothed with mingled shades of restful green and made to seem in keeping with the grass and trees about them. The interest and beauty of a house may be so largely increased by the vines draping it that the real character of the house is forgotten. A house overgrown with Virgina creeper and wistaria so attracted a man in search of a home that he offered to pay the owner's price without even going into the

In your back yard seek such an arrangement of trees, shrubs and vines as will insure seclusion, blot out your out-buildings, and leave a grassy plot in the middle, all without the use of straight lines and formal settings. Here is a chance for originality and artistic ability. Each person will be best satisfied when the aim is set before him to seek its accomplishment by his own methods. The various evergreen trees have their place in such a scheme for screening as well as many hardy shrubs. The snow-ball, especially the Japanese snow-ball, which is very superior, the syringa, the lilac, the weigelia, the spireas, among which the Bridal Wreath is a favorite, the hardy hydrangea, and some of the hardy roses. Also there is the barberry, the

tamarisk with its graceful shoots reminding one of long, waving plumes, and the golden elder with its beautiful yellow foliage. Our native sumach, if cut back to the ground each year, gives quite a tropical effect during the summer and is glorious after the frost with its scarlet and vellow and its rich dark berries. Among the shrubbery a wild crab-apple tree will present a beautiful effect in blossom-time and the hawthorn, too, is worthy of a place. If you plant cultivated fruit trees in your yard thinking to secure the same shade as from forest trees and greater beauty with fruit besides, you must be prepared to spray them and give them close attention, otherwise the blight or some other disease may cause an offensive spot in your garden. Plan for a shady place where you may swing your hammock or place a garden seat and there enjoy the beauty and quiet of your garden to the full, but don't have too many trees. Flowers love the sunshine and we ought to love it, too. People pay liberally for the privilege of taking sun-baths in the glass-roofed solariums and sanitariums and we should appreciate our opportunity to benefit by the sunlight in the pleasanter surroundings of our gardens.

And so we come to the flowers themselves. Those which I shall mention are perfectly hardy. Start them once and they will take care of themselves. Some may need a covering of leaves in the fall and most will benefit by having the ground stirred about their roots and a fertilizer applied occasionally. But they are faithful friends, will overlook much neglect, and be ready to greet you cheerfully each spring. They are far more deserving of cultivation than the annuals that require constant fussing over them and then die with the first frost. I shall group them according to color because a mass of one color against the green background of the shrubbery is far more effective than a

mingling of many colors.

If you would have blues, plant crocuses thick amidst the grass. They will appear even before the snow is gone, cheerful harbingers of spring, and will hold their own year after year in spite of the grass with no care at all. Various irises, the Japanese being the finest, will afford many shades of blue for the bor-

der and are beautiful, lily-like plants.

The bluebell and Jacob's-ladder (our so-called forget-me-not) from the woods lend themselves agreeably to garden treatment. They must appear in masses to be effective. A few plants look forlorn. The blue wild phlox is very beautiful if massed, and, like the Jacob's-ladder, preserves nice foliage all the summer. Among the taller blue flowers are the columbines and the whole family of larkspurs. The latter are tall, stately and picturesque in habit. They produce immense spikes of flowers of every imaginable shade of blue for a very long season during the summer.

The flower-spikes are sometimes two feet in length and the variety and combination of coloring is lovely beyond description. The plants range from three to seven feet in height, all perfectly hardy and prepared to thrive in any soil. There are also hardy asters in many shades of blue. The list of hardy blue flowers given is by no means a full one. It is designed only as a suggestion of what may be found to furnish blue flowers from

the time snow disappears till hard frosts come.

Nothing is more cheerful than yellow and for a yellow border a background of the sunny foliage of the golden elder is most harmonious. The season would open with yellow crocuses and jonguils. If you are willing to replant every few years, many beautiful tulips can be relied on for rich show. Creamy irises and golden lemon lilies will follow. The Persian Yellow and Harrison Yellow will furnish roses in June. poppy then begins to bloom. From fern-like foliage it lifts its blossoms of all shades of yellow on stalks about a foot high. The flowers are of delicate texture like silk crepe, about two inches across, and appear in wonderful profusion till November. A place for the hardy coreopsis must also be found. It is a strong-growing plant producing a great abundance of lovely vellow flowers that are excellent for cutting. Here, too, belong both the dwarf and the tall golden glow and some of the perennial sunflowers. The black-eyed Susans and some varieties of golden-rod would appear to advantage in this border.

Are you partial to red and pink? You will find all shades among the peonies, double and single, and to quote Elliott: "There is nothing more deserving, when the merit and beauty of the newer varieties are known every garden will contain a large collection. Like the Irishman's whiskey, all varieties of peonies are good, even the commonest old-fashioned sorts, but there is no language to describe the glorious beauty of the finest of the newer varieties. In no other flower has there been such a marked improvement and they actually surpass the finest rose in size, form and coloring and their ease of culture and extreme hardiness are too well known to enlarge upon." Of all the flowers none makes a more brilliant showing than the Oriental poppy and none is a more persistent perennial. Its large, deepcrimson flowers, having a conspicuous black blotch on each petal. are produced freely on stems about two and a half feet high. Unknown to most gardens and deserving of a place in each is the hardy gaillardias. Its gay blossoms so highly colored are obtainable in perpetual profusion from June till November. No more brilliant and beautiful sight can be imagined than a large bed of gaillardias and they are simply invaluable for cutting. The perennial phlox has been so improved that its rich shades of red and pink make us forget its relationship to the abhorred old magenta phlox. It is sure to give delight. The hollyhocks, while really biennials, are so ready to self-sow that a colony has been known to maintain itself for twenty years. As a background for lower growing plants they are very effective. The same is true of the beautiful foxgloves. There are a number of handsome hardy lilies that should be planted. Among the low-growing plants, sweet-william, June pinks, and creeping phlox can be depended on for beautiful color. If you are willing to dig the bulbs and store them as you would potatoes, you can have the Torch lily or red-hot poker and, when grown in masses, its flame is of the kind that will burn a hole in the landscape.

But nowhere can such delicious fragrance, such variety of form, such satisfying beauty be found as among the white flowers. Whatever else the garden affords let there be plenty of white. White snow-drops, crocuses and daffodils in early spring will put winter to flight two weeks before his usual time. Daffodils, among which is the poet's narcissus, are especially desirable for they are sure to live and multiply and their beauty justifies Wordsworth's praise. But one should see them as he did. You know he said:

Ten thousand saw I at a glance,
Tossing their heads in sprightly dance,
I gazed and gazed but little thought
What wealth the show to me had brought,
For oft, when on my couch I lie,
In vacant or in pensive mood,
They flash upon that inward eye
Which is the bliss of solitude;
And then my heart with rapture fills
And dances with the daffodils.

It is easily possible now to have them in hosts for they are sold at the low price of five dollars a thousand. White peonies are lovely and a cloud of white phlox seen through a mass of shrubbery in the early morning will give even the most hardened business man a sensation worth having. Among white lilies the longiflorum, album and day lily are perfectly hardy. The Shasta daisy should be planted freely for it is hardy as an oak tree and produces from June till late October an abundance of snowy-white blossoms of large size. The best of all white flowers of autumn is the peerless Japanese anemone whirlwind. The blossoms are two or three inches across and last from September till hard frost.

From what has been said you will see that there is abundant opportunity to secure variety in kind and color of flowers and have a constant succession of bloom from early spring till late fall without the need of beginning your garden anew each year. Plan to retire your petted annuals, always insistent for care, just as fast as you can establish their self-supporting brethren

and then no matter what withholds you from your garden you will find flowers there in their season. Just two words in conclusion: Plant flowers!

THE RED WOOD LILY.

The Red Wood Lily (Lilium philadelphicum) is less frequently found now than formerly. It is more robust than the Western red lily, and grows in a more shaded location.

It was not an uncommon sight to see the erect cups of the Western Red Lily, where the grass was more than a foot in



RED WOOD LILY, (Lilium philadephicum).

Photograph by C. M. King.

height, when wandering over the untrodden prairies. It was more frequently seen than the Yellow lily (*L. canadense*), which grows in moist soil. Both the Red and Yellow lily have given better satisfaction when planted in grass land than in good garden soil that has been under intensive cultivation.

NOTES ON GROWING PEONIES.

H. A. TERRY, CRESCENT.

(Read before the Southwestern Society.)

There is no secret about growing peonies. The plant in its character and habit of growth is much like that of the garden rhubarb.

They are both intensely hardy and require about the same cultivation as they are much better to be divided up and planted in autumn.

To grow peonies in perfection, the soil should be made very rich and mellow, and the roots should be placed so that the buds are about four inches below the surface of the ground.

The best time to plant is about the first two weeks in October, but planting may be done from the middle of September until the ground freezes, and they may also be planted in spring, but autumn is considered much the best time.

If good strong roots are planted about the first of October, they are almost sure to bloom the next season, though the flowers will not be so large and fine as they will be on older plants. The plants should not be allowed to stand in the same place more than six to eight years, though the writer of this has plants that have not been moved for twenty years, that now bloom freely every year, producing twenty to thirty flowers each year, still the flowers are not as large and fine as those on younger plants.

In dividing the plants one must be careful to have a bud on every root, and a root to every bud.

The peony is intensely hardy, growing and blooming nicely in Manitoba and all parts of Canada, in fact it seems to be adapted to almost every soil and climate.

The writer of this has been growing peonies in this county for more than forty years, and has never known a plant to be injured by winter in the least.

In fact I have known roots to lay on top of the ground all winter and grow freely in the spring. But hardy as they are, we think it is better to mulch the plants in the fall with straw, or stable manure, as they will produce better flowers by so doing.

There are over two thousand named varieties of peonies in cultivation, but a collection of two or three hundred varieties will probably include nearly all that are really valuable, still they all differ either in flowers or plant, and nearly every one desires something new in this line.

The question is often asked of the writer, if they cannot grow peonies easily from seed, but I do not give the inquirers much encouragement. It is the most difficult plant to grow from seed that I am acquainted with.

The writer has been over forty years growing seedling peonies

and has planted pound after pound of the seed, and has produced only about one hundred and fifty sorts that are of value.

It often occurs that one may plant a thousand or more seeds and not get a plant that will be worth growing. This is rather discouraging, and it is probably cheaper to buy plants already grown.

SMALL WHITE LADY'S SLIPPER.

The White Lady's Slipper (Cypripedium candidum) is becoming rare in Iowa. Formerly they were quite common in moist meadows and in low boggy places. While these plants



SMALL WHITE LADY'S SLIPPER, (Cypripedium candidum).

Photograph by C. M. King.

must have plenty of moisture, they do not thrive where water stands above their roots.

There are four native species of Cyripediums in the state; the Large and Small Yellow, the Small White and Showy Lady's

Slipper; the last is the prettiest and grows in the wettest soil. The Large and Small Yellow Lady's Slipper usually grow in shady woods or thickets; while the Showy and Small White are found in more exposed places; they all thrive best in shady locations.

As the Moccasin-flower is not an aggressive plant, it will soon become extinct unless more attention is given toward saving the native plants from destruction.

Don't try to grow them where potatoes thrive or you will only have some experience as the reward of your effort. If you admire these plants it will pay you to sit by the roots of the Cypripedium for a year or two and learn what humidity means and what humid conditions are.

PLANT ŒCOLOGY.

(A stenographic report, without revision, of what Prof. T. H. Macbride, of Iowa City, said in response to a toast at the banquet of the State Horticultural Society.)

No doubt this patient audience has been sitting here a long time waiting to be enlightened on the meaning of the word Œcology, and I wish to say at the outset that I believe some have been trying to find out, for being in the Capitol building today, I turned to get hold of a dictionary, and lo and behold, it was open at Œcology! I went into another room and saw the voluminous authority, and behold, that dictionary was open and open at the same place! From such experience I know that everybody wants to know the meaning of that word.

The subject, "Œcology" was not my choosing. I am bidden to tell about this thing, whatever it may be. I may say that somebody has suggested to me that possibly it is a new vegetable; possibly a cross between a banana and a potato. At all events, I believe all horticulturists should cultivate the delightful fruit.

But let us look at the word seriously for a minute. The first part of the word is the first part of the word economy. Now, as everybody knows, economy means the management of a house or household. Ecos a house. The second part of our word, logy, is the same that we meet everywhere else—geology, entomology and all the other ologies. Logy means science; so ecology ought to mean the science of the household; and that is just what it does mean; the science dealing with people's mode of living. When you apply the word to plants, you mean to say that plants have a way of adjusting themselves to their surroundings; and scientific people are ecologists when they try to find out the science of the manner in which plants adjust themselves to their surroundings. How much that means, I may perhaps have just a moment to explain. It means, first, that plants are responsive things. I know we think we are gifted creatures;

we are responsive. Don't we hear? Surely. Don't we see? Surely. Can't we put our hands up to the steam coil, touch something warm and feel the heat? Surely. What remarkable creatures are we! And yet, there is not the simplest plant but that does respond to all the forces that play about it. It seems to me even sometimes better than that; the response takes the form of motion, intelligible motion. If I had time and it were not midnight, I could possibly tell you we have learned lately how light, sound and heat are simply modes of motion; that is all; just modes of motion. When I speak to you and you hear, the perception is not different from that which you would have should I toss a handful of shot out here and you should feel their impact. When you look up and behold the light of day and that light smites upon your eyes, it comes with force, and you see. It is a mode of motion; a response to some external force. Think of it. And so every plant does respond, and beautifully respond.

One time, not long ago, a man got lost in Illinois, by falling down a coal shaft. He was walking on the sunny hillside, and down he went. As he went down the shaft closed behind him. He found himself not much hurt, but in absolute darkness. He heard the dripping waters; he could hear the rustling wings of the bats that passed him. He could hear; he could hear the screams of the uncanny creatures in the middle of the mine. He could hear; he could hear the sound of the happy people as they drove and walked upon the solid ground above his head. But he could not see. So he groped his way about, and by and by, in the course of thirty-six hours, nearer dead than alive, at last he saw a glimmer of light yonder, and by that clue he made his way to the daylight and the world. He could see.

Not long ago I was in an old cellar, away down among the boxes and the barrels. The owner wanted to show me something in front of the building, and standing there, I noticed a potato sprout. I began to trace it. It was back there; I could not see. Only away out a little light came through the manhole in the walk. We took a light and I followed the sprout around, along the wall, and around the boxes, and by and by, away back yonder, twenty feet from the place where I first discovered the plant, I found the potato. That poor little potato, in the darkness of the cellar, had found its way at last to a little beam of light which came through by a window in the stone sidewalk of the street. That poor potato! Which was more responsive to the light, the living man or the living plant? Friends, the whole living green world is as one vast eye; related wonderfully to light. Now, Œcology tells how plants in

their terrestial home are related thus to this beautiful energy that the human eye delights to hail as light.

It is this delightful responsiveness on the part of plants that makes horticulture possible. Horticulture changes the environment of a plant and the plant responds, in leaf, in flower, in fruit. Sometimes I tell my classes to go out yonder, now that the leaves are falling, run among them, hear them rustling and bring me two leaves alike. I have yet to see the first two leaves alike come in. Nature is forever adjusting; she is never in equilibrium; all quivers; just varying a little bit; never still; and she says to skillful man: Come, lead me, guide me, lead me as you will, and bring me to the perfection that you seek. Why, it is old, this art by which we read the plants. In the "Winter's Tale," that some of us have read, Shakespeare makes Polixenes answer:

You see, sweet maid, we marry A gentler scion to the wildest stock; And make conceive a bark of baser kind By bud of nobler race; this is an art Which does mend nature,—change it rather; but The art itself is nature.

So, friends, I congratulate every man who raises fruit and flowers and trees, and brings forth new buds and new plants. He is an Œcologist. His errand is that which comes nearest to nature, and as God has created the world, here are men who are workers together with Him, touching nature most intimately and most nearly, most effectively, because most lovingly.

The fact is, friends, the wisest of us can ask no more of fate,

Than to be simple, honest, manly, true; Safe from the many, honored by the few; To count as naught in court, or church, or state, But inwardly in secret to be great. To touch if not to grasp vast nature's endless clue, And learn with each experience how to wait.

SCHENK'S OAK.

Schenk's Oak (Quercus schenkii) is also known as the Southern Red Oak or Texas Oak. It is a large tree and seems to be between the Northern Red Oak and Scarlet Oak. The wood has a finer grain than the Northern Red Oak; the leaves are more deeply pinnatified, like those of the Scarlet and Pin Oaks, but the acorns are more like those of the Northern Red Oak.

The range of the Southern Red Oak is from the Gulf States up the Mississippi valley to northern Iowa. It usually grows on bottom land but not infrequently on hillsides. The wood is used in factories for the same purpose as that of the Northern Red Oak.



SCHENK'S OAK, (Quercus schenckii).

Photograph by B. Shimek.

The Editor's Page.

THE editor of IOWA HORTICULTURE believes in individuality, he hopes it may reflect the opinion of the Society, but can only do so through the expression of its membership. No article will be admitted to its pages that the writer is not willing shall appear over his signature. The editor alone is responsible for all unsigned articles. He will try to tell the truth, though he may be mistaken as to the facts and wrong in his conclusions, but the errors will be of conception and not of intention.

WILLIAM CULLEN BRYANT was a great lover of Nature and his sympathetic heart always responded to the many lessons which she taught. What a graphic picture his active imagination drew of the mound builders in "The Prairies."

> And did the dust Of these fair solitudes once stir with life And burn with passion? Let the mighty mounds That overlook the rivers, or that rise In the dim forest crowned with oaks, Answer. A race, that long has passed away, Built them; a disciplined and populous race Heaped, with long toil, the earth, while yet the Greek Was hewing the Pentelicus to forms Of symmetry, and rearing on its rock The glittering Parthenon. These ample fields Nourished their harvests, here their herds were fed, When haply by their stalls the bison lowed, And bowed his maned shoulder to the yoke. All day this desert murmured with their toils, Till twilight blushed, and lovers walked, and wooed In a forgotten language, and old tunes, From instruments of unremembered form, Gave the soft wind a voice. The Red-man came-The roaming hunter-tribes, warlike and fierce, And the mound-builders vanished from the earth. The solitude of centuries untold Has settled where they dwelt.

The early settlers remember the many excellent varieties of plums that flourished here when they came, and since many of them have been improved by cultivation. The belief has been expressed by horticulturists that the good qualities of many of these wild fruits and their rapid improvement under cultivation is due to the careful selection and cultivation given to them by pre-historic man.

That the Mississippi Valley was once inhabited by, at least, a semi-civilized race, seems evident from the remains that have

been found in these mounds. That these ancient people tilled the soil and kept herds and flocks, is probably true. That they should select and plant the seeds of the best wild fruits and nuts they could obtain would seem reasonable, and when these people ceased to care for them, they reverted to their normal condition in the struggle of the survival of the fittest, or else perished altogether.

The fruits most relished by man are improved through his agency, and usually the improvement is not necessary to the life of the plant, and often detrimental to its vital energies. It is either the enlargement of the receptacle on which the seeds are placed, or else the thickened covering of them. The apple and strawberry are good examples of his patient care and labor in developing fruits to please his palate.

It is not beyond belief that these ancient people did by careful selection and cultivation through many generations, impart to some of these fruits and nuts a potency which they still retain in a latent condition, and when these fruits are again brought under cultivation it may be awakened into activity and cause some of the improvement noticed in these seedlings.

The flora of Japan has many species of plants more nearly related to those found in the United States, than those of west Europe. Plums from Japan are in shape of tree, leaf and bud more like the wild plums of this country than those of the domestic class of west or central Europe. Did these ancient people bring fruits with them, in their migration hither, as is the custom in modern times, or did their descendants, journeying westward, write the hieroglyphics on the banks of the Ganges, Nile or in Yucatan? Who knows? Only silent echoes answer.

This is the month for seed and plant catalogues to arrive, and it seems as though their number is increasing year after year. They are agents that travel by mail; are less obtrusive and persistent in their demands on our time and money than other agents, therefore more welcome. They wait patiently, when laid aside, until we have time to consult with them.

A good deal of space is usually taken in these catalogues in extolling the merits of novelties. Few of these, however, ever secure a permanent place in the trade; yet it is only by trying a few of the most promising new things that real progress is made in securing better varieties of vegetables, fruits and flowers. Occasionally we do get something better than anything we have had.

See to it that your order is placed in time for farm and garden seeds, or for plants and trees for the orchard or lawn, so they may be on hand when the planting season arrives; if delayed until then the stock you desire may be exhausted, or the

rush of other work may cause it to be neglected until too late to give good results, or it may be abandoned entirely.

Good fruit and vegetables add much to the enjoyment of the

table, and thus help increase the pleasures of life.

Trade with your local dealer if you can get as good service from him as abroad; by so doing you encourage home industry and help build up the community. If there is one thing a farmer or gardener needs more than another it is a home market to .consume the surplus products.

If we would be successful in business we must give attention to the smallest details, let no part be neglected.

Select such crops as are adapted to the soil and location and continue to grow them, do not change from one crop to another because they fail occasionally, or prove unprofitable. The man who is continually changing from one thing to another seldom

succeeds in anything.

Subscribe for, and read a number of the best horticultural and agricultural papers, and when we find anything that is new to us and suited to our location and circumstances, apply it; in this way we will keep in touch with the thinking, practical men who are making a success of their business. Books are useful and should not be omitted from our course of reading, the daily and weekly papers get the facts before the public a year or two in advance of books; the latter, however, have the information in better shape for future reference.

Attend horticultural meetings and farmers' institutes, whenever there is an opportunity, or circumstances will permit, for in the council of many some knowledge is gleaned.

WE BELIEVE the elements of horticulture and the sciences related thereto, should be taught in the public schools in the rural districts. There is nothing very difficult about these studies that any boy or girl could not understand, why not teach them touse their hands and eyes to distinguish the difference between the shape of leaves of plants, the bark and buds of trees, their seeds and roots, and how to propagate them? Anything difficult about that? How many people can tell the difference between the leaf of a Hard and Soft Maple, an Aspen and Cottonwood? Alas! How many people go through life with their eyes shut, who never see the beautiful things about them everywhere. The man with scales on his eyes can't see where the water is that he may wash them off; some one must lead him to it, or wash his eyes that he may see.

The little log house at the cross-roads, with its three R's, was congeneric with the college having a classical course of studies, that dreamed of the past and whose only thought was,

how to express it. The colleges of today are schools of investigation with laboratories for research work, and the little red school house on the hill will soon be embowered in a garden of roses with all the accessories necessary to teach the children how to see the beautiful things of this world, instead of stretching their minds in a mental gymnasium. If this is class legislation, let me say, that our calling comes very near every man, woman and child that eats vegetables, and they ought to know something about what they eat, whether it is wholesome or not, how it was produced and whether they are getting the best there is for their money.

When you pay fifty cents or a dollar a pound for a new or rare potato and want to increase your stock of it rapidly, cut it into pieces with one eye in each piece and plant in a hot bed; when the sprouts are up, dig the plants and separate them from the pieces, which you should replant; then pot the sprouts and when they are five or six inches high, cut off the top and put these in the propagating frame and they will root in two weeks, when they may be potted. By that time the eye-pieces will have another crop of sprouts, which can be separated again. In this manner you can get four or five sprouts from each compound eye and make a large number of cuttings from the sprouts. We have raised over 100 pounds of tubers from a small potato not larger than a hickory nut.

THE BUR OAK.

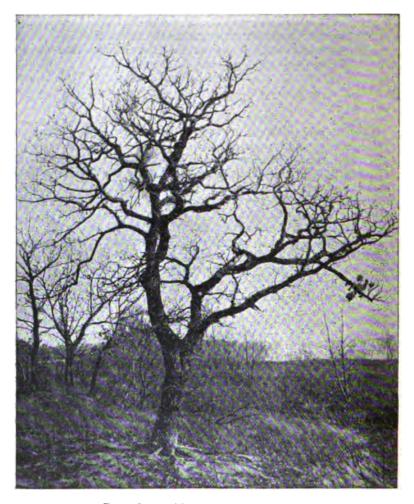
The Bur Oak (Quercus macrocarpa,) is the most widely distributed in the state of all the native oaks. The leaves are large and wedge-shaped and sinuately-lobed so they are easily distinguished from other oaks. In the spring they are yellowish-green when they first push from the bud, and in the fall they take on a dull yellow, they never, at any time, show any red as many of the other oak leaves do.

The burr oak is capable of adapting itself to almost every condition in which an oak can grow. When crowded in groves, in rich soil, it grows tall and symmetrical; in an exposed position, it forms a low round head, with massive branches that are unmoved by an ordinary storm.

The wood of the Bur Oak is the most useful of all oaks. It is heavy, tough, fine grained, and durable. It makes good posts or ties. The lumber is in demand at factories. It is much used in cabinet-making and cooperage, and in the manufacture of agricultural implements.

The tree gives tone and strength to the landscape. Its rugged

outline, and vigorous growth appeals to all tree lovers, and then too, it has those homely traits of usefulness which endears it to every one.



Bur Oak, (Quercus macrocarpa).

Photograph by B. Shimek.

SOME GRAPES THAT I HAVE RAISED.

HENRY LAU, DAVENPORT.

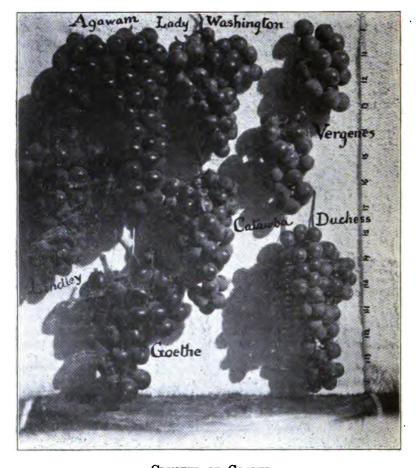
This article will attempt to relate experience concerning different varieties of grapes, as grown by the amateur for home use. Some years ago, when a prosperous agricultural fair society, now defunct, offered very liberal premiums for the largest and best collection of grapes, it was deemed advisable to plant of many kinds; about fifty varieties were secured in the course of time, the entire plantation, at present amounting to one hundred and twenty vines. A southern hillside not being available, they were set out eight by eight feet apart between the orchard and garden, sheltered from all sides except the south, the ground sloping gently to the west, the soil a dark prairie loam, well drained by tile.

The vines are pruned in the fall, renewing when possible, and all, except Concord, are laid down and covered with earth. A good deal of summer pruning is done, with the aim of increasing the size of bunches, but it rather seems to increase their number. Only one variety, Concord Muscat, a white grape of astringent sweetness, persists in being a shy bearer. Moore's Early and Norton's Virginia produce a sufficiency; all the rest come to the front with from three to five times as much bloom as the vine can mature grapes in an average season. Not more than one bunch should be left to each shoot, and even this is too much for late or delicate kinds, or such as make very large bunches. If highly flavored and well ripened fruit is desired vines must not overbear; some kinds are permanently crippled by excessive fruiting.

While it is easy enough to obtain bloom, many kinds do not set well, and a large and promising cluster of bloom will make only a loose, ragged and imperfect bunch of grapes. This is apt to be worse if the vines are exposed to a strong wind during blossoming time. Lindley, Creveling, Amber Queen, August Giant, and in some seasons, Agawam, are defective in this respect. On the contrary, some varieties are too compact, and the berries are apt to force each other off the penduncle. Elvira, Diana, Woodruff and Diamond are of this kind; it might be advisable, when the fruit has set, to thin out with small scissors, as is done with exotic grapes. It is recommended to plant late or delicate varieties on the south side of a building, or even a tight board fence; in such a position they are comparatively immune from disease and even Catawba ripens by the 15th of September. Where a large space is thus to be covered, the spur system of pruning will have to be used; the writer has a vine on his barn fifty feet long.

The quality of fruit varies much in different soils, seasons

and degrees of culture; a year like 1902 produces grapes that are not fit to eat. Under such unfavorable conditions, some sorts show weakness of foliage, losing it to some extent, and of course not maturing the fruit. Vergenes, Lindley, Brilliant and Delaware have this fault. In other sorts the berry is attacked by rot and mildew, and in this connection it is noticed that Concord and Worden are as susceptible as the rest. While the writer always puts paper sacks on the grapes, he has never succeeded in doing



CLUSTER OF GRAPES,
Showing, comparatively, the size of bunches and berries of the different varieties.

Photograph by H. Lau.

it early enough to find out whether they are a protection from disease or not.

During a period of thirty-five years, it has happened but once that the new growth was killed by spring frosts (May 14, 1895,) and in the winter of 1898-1899 the roots were more or less killed even where the vines had been laid down and covered. Of these Woodruff seemed to be the only one that was not injured. It is a showy grape, rather pulpy but very sweet when well ripened and large for a two-pound paper sack. It is very apt to overbear and if the clusters are large they ought to be at least eighteen inches apart. This also holds good for Diamond, which of all the varieties tested, makes the heaviest clusters. It has the best flavor of the white Concord seedlings, but one is easily surfeited eating it. Its berries are apt to ripen unevenly on the same bunch, the skin is very thin, liable to crack and subject to disease.

When it comes to sampling grapes, it is advised to start on the mild flavored ones, such as Duchess, Prentiss and Lady Washington and finish on those of a strong and pronounced aroma like Agawam, Barry and Catawba. The taste of Duchess is like that of California grapes, one can eat a great many of them, it makes long and fairly compact bunches. The berries are dotted with minute specks. The finest white grape for eating, as well as exhibiting, is Lady Washington. When properly cared for, it makes immense, cone-shaped bunches of translucent berries. On a three-wire trellis, eight feet long, eight or nine bunches are about right; the same rule will answer for Jefferson, Wilder and Iona; these, as well as Prentiss, Catawba, Goethe and Lady Washington should be planted on the south side of a building, and each vine placed on a bushel of bones. Of course they ought to be laid down and covered with earth and in case of a snowless winter, it is well to mulch for root protection. Then if the growth and fruiting is carefully controlled during the early summer, they will be free from disease and the fruit will be fit for a king.

The finest early white grape for general cultivation is Green Mountain, the finest early black is Jewel; it is among the blacks what Delaware is among the reds; it produces small, compact bunches of fine quality. Moyer gives poor satisfaction: it was many years before it came into bearing, and its flavor is much inferior to Delaware. Empire State makes long bunches of good quality, but in some seasons its berries will shrivel and drop, like those of its parent, the old Hartford. The Munson seedlings have only borne this year and last, and both seasons being unfavorable, judgment is suspended. Nor will grapes be as fine and large when they first begin to bear, as later on when the vine is well established. We must not omit the Brighton in our list; it ought to be planted among good fertilizers and not permitted to

overbear; under favorable conditions it makes beautiful bunches of the largest size.

Rogers seedlings produce a variety of distinct flavor not found elsewhere. Barry is a good black grape, a short, very broad bunch and large berries, flavor rich and spicy. It is thickskinned like Agawam; this one has an aroma all of its own; it should be in every collection. Herbert is a fine black grape, early and fine quality. The above can be grown with ordinary care, but Goethe is rather late, and in a season like the last will not ripen in the garden, on the barn it never fails to mature by the first of October. It finishes the season, together with Norton's Virginia, the only specimen of the Æstivals family here present. Though late it never fails to ripen its fruit with ordinary care, is entirely free from disease, its fruit can remain on the vine until well in October. The berry is rather small and has too many seeds, buts its quality is superior to any of the black Labruscas. Being entirely distinct in appearance, it, as well as Elvira, should form a part of every grape exhibit.

Pocklington and Niagara may be valuable market grapes; the writer has but one specimen of each and that is enough. Martha is a little better. Rebecca better yet, but too delicate. The Eldorado is spoken very highly of by Eastern growers, it has been frequently ordered, but the honest nurserymen always send something else.

BUSY DAYS.

WILLIAM LANGHAM, CEDAR RAPIDS.

June 5: Signs of the approaching fruit season have been multiplying of late. The old pickers by twos, threes, and fours, with new recruits, are almost daily making pilgrimages to Mystic Bluff, to see the beauties of the country and to enjoy its fresh and balmy air, so they say, but they are always sure to inquire when picking will begin, and whether we shall want their help. We are glad to see them, and a memorandum of names and places of residences is kept.

Then, too, occasionally, a flock of wax-wings drop down, unheralded out of the sky, like a specter from the upper deep, and wonderful to tell, always light in close proximity to the Early Richmond cherry trees. This sudden and audacious foray of these dainty little beauties is a truer and surer token of the approaching cherry season than the judgment of your own eyes. I used to be greatly worried when a flock of these marauders swooped down on the cherry orchard, and made it their permanent headquarters for the season. But since the agricultural department at Washington has clearly and conclusively

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shown that this bird has been much maligned, and grossly misrepresented, and that it is really a friend to agriculture, and to horticulture in particular, I have concluded that I must have been, all these years, the victim of some optical delusion.

Every mail brings us letters from customers, north and west, to whom we have sold fruit in former years, requesting us to ship so many crates each day as soon as the season opens. Rumors are current that some of our neighbors who have a more favorable location and warmer soil than ours, are already catering to the market at fancy prices. But today when little Edith, our grandchild, brought in two handfuls of scarlet beauties from the strawberry patch, we knew and realized that the cam-

paign was on.

In harvesting the berry crop (and in this category for convenience, I include cherries, plums, and grapes) there are certain things which are absolutely necessary and which must be provided for, if you are in the business on a commercial scale. In ordinary farming operations, people usually think that the harvest season is a very busy one. Threshing which comes along in due sequence, is always looked upon as a most laborious occupation, and disagreeable as well, while the marketing, if not so pressing, requires much time and labor. On a fruit farm, figuratively speaking, harvesting, threshing and transporting the product to market, are going on almost daily, all at the same time, from June to October. If you are of a strenuous disposition, and are looking for perfect happiness just add to the above, the care and management of from fifty to one hundred pickers. If this does not bring you the coveted bliss, you need not look for it in this world. Let me enumerate the most important of these necessary things in handling the berry crop successfully:

(1) Packing sheds.

(2) Tally keeper and crater.

(3) Field boss, or foreman.

(4) Crates and boxes, baskets, ladders, etc.

For all places distant from the house, we use tents for packing sheds. A standard wall tent of 10 oz. duck, 14 by 16 feet, makes a good all around substitute for a wooden structure. This tent should be made to open at both ends for easy ingress and egress and for perfect ventilation. Although 14 by 16 feet is not a large size, yet you will be surprised at the amount of business which can be transacted in it. And you will be more surprised to see how many pickers can find shelter under its friendly roof during a rain storm. The furnishings are as follows: Two platforms, each two feet wide and twelve feet long, placed one on each side of the tent and six to twelve inches from the wall. On one of these platforms crates filled

with empty boxes are stacked, while on the other, next to the tally-keeper, are placed those filled with berries. Next comesthe packing, or crating table, which occupies the center of the tent lengthwise. This table need not be made of mahogany, nor yet of quarter-sawed oak, but of three good substantial store boxes, made of one inch pine. Each box may be 28 or 30 inches high, the same in width, and 2½ to 3 feet long. Placed end to end, this gives you a table seven and one-half to nine feet The center box should have one side removed, and the space divided into at least four compartments by longitudinal divisions. Here in one compartment are the covers for 16 quart crates; in another are the covers for 24 quart crates; in a third are odds and ends, and in the fourth can be kept, when not in use, nails, a light hammer, and a sharp knife (you sometimes have to trim or cut down covers to size). In front of this center box the tally-keeper stands and crates the berries, and on it he nails the covers on the crates when filled, the partitions put in having made it strong and firm for the purpose. good waterproof covers for contingencies, and extra number of carriers, and perhaps a large box for surplus empty berry boxes, complete the equipment.

If you are picking fifty crates or more each day, it is convenient to have a smaller tent close by to hold surplus crates. boxes and covers. In case any berries remain over night, the crates are usually left in the tents, ends open, for good ventilation. I have never vet seen any arrangement which excelled this for keeping fruit nicely. It is wonderful to see how much stormy weather good tents securely staked down, and guy-ropes properly fastened, will withstand. We always aim to put them up in the most sheltered locations, yet sometimes the severe storms of June and July make matters lively and interesting. A wind and rain storm one afternoon once prostrated three tents for us, in as many minutes, the damage, however, being merely nominal. Our temper was ruffled, perhaps, more than the tents. Many are the times I have been compelled, in the dead of night, to visit some tent where we had left berries, to close it and to put everything in ship-shape trim against an approaching storm. On one occasion, still fresh in memory, I was aroused out of a deep and tranquil slumber by the most terrific and appalling peals of thunder. I hastened out to see rolling up from the west a vast mountain of clouds, dark and forbidding. and lit up with incessant flashes of lightning. We had left thirty-five crates of berries in a tent for the night. had seen much service, and unfortunately had been put up in rather an exposed situation. I had just time to reach it, to close it, and to throw a waterproof over the stack of crates when the storm struck us, and in an instant tore the canvass into ribbons and beat the whole fabric to earth. I remained cooped up under the debris till the tempest had passed by. Morning found every crate intact and in perfect condition. The ample waterproof had proven its great worth, but the tent had been wrecked beyond avail.

The tally-keeper and crater, as the name implies, gives credit on the tally-sheet for the berries as they come in, and crates them. This important individual for short is usually simply called the tally-keeper. He has absolute control and command of the packing shed or tent. There he is "monarch of all he surveys." Though his principality is small, it is often a very busy one. The tally-sheet contains the names of the pickers and their corresponding numbers. By this I mean that the first name written down is number 1. The next is number 2, and so on, and this order is never changed throughout the entire season. There are several very important advantages in this arrangement. First, it is much easier to find a number than a name in a long column. This saves valuable time. Secondly, it enables the tally-keeper to check all attempts at fraud. grieves me to say that there are some pickers who think that dishonesty is the best policy, and who proceed to carry out their views by putting leaves, stems, and green fruit in the bottoms of the boxes. This fills the boxes rapidly and swells their bank account correspondingly. Where such conditions exist the tallykeeper should repour a box now and then, or better still, put each picker's number on every box of berries or package of fruit he brings in. This latter method with us has never yet failed to have the desired effect. There is another sharp practice which the tally-keeper, in conjunction with the field-boss, must guard against, that is, repouring. If so inclined, a picker can repour six or eight quarts of berries, and make an extra one. This is not only dishonest, but it damages the fruit. We put a ban on repouring except to fill up partially filled boxes. But nevertheless there is some of it done, sub rosa. The tallykeeper should not receive packages or boxes unless properly filled. In case of boxes they should be gently rounded with corners filled. Pickers are always instructed to see that they receive credit on the talley-sheet at the time they deliver their berries. The tally-keeper should inspect each crate before using it. The want of a nail or two might cost a crate of berries. At the close of each day's work the tally-sheet is footed up, and the sum total should equal those sold and on hand. Each individual account is transferred to a general pay-sheet. This paysheet and all the daily tally-sheets are kept to the complete close of the season, to be referred to at any time in case of difference or dispute. With us the custom is to pay Saturday afternoon.

We often have pickers, however, who do not draw their pay till the close of the season.

The field-boss, or foreman, has charge of the pickers in the field. He assigns each one his place, and sees that he does his allotted work reasonably well, and in placing small fruit that he does not miss or shirk any part of his row. The average picker is always looking for something better beyond. If he is on a row where he is getting gold dollars instead of berries, he will leave it at the first opportunity, in hopes of finding eagles on another. Leaving a row unfinished is the unpardonable sin in a berry picker. The field-boss must keep an eye out for laggards and loafers. A loafer is a disturbing element in a berry field, and must be induced to go to work or else leave the premises. He, the field-boss, must be full of vim and energy and push. He must know just when to coax or threaten, to scold or cajole. And he must watch the heavens in lowering weather, for if a storm impends, he must get all fruit under shelter before it comes.

Often in the rush of the season a third person, a sort of factotum, is necessary. He can help the tally-keeper in the packing shed when he is pressed with work. He can help load the wagon for the city. He can see that the water supply is kept up, or he can help the field-boss make inspection, to be sure that the pickers have been doing good and clean work, or he can take charge of part of the force when finishing one patch and commencing another.

Crates and boxes, and other packages for cherries, plums and grapes, such as baskets of different sizes, may be classed as necessaries because business can not go on without them; and so also ladders, platforms (two trestles with planks across for tree fruits), and carriers. The supply of crate and box material in the flat, and other packages should be procured long before the fruit season opens. In estimating the quantity you shall need be liberal in your own figures. Better have a surplus of a few thousand than run short. I have had some unpleasant experience along that line and know whereof I speak. Just this season a car over-due two weeks with 20,000 box material and crate stuff to match caused us no end of trouble.

If you have ample storage, a liberal supply of boxes and crates should be made up during the winter and early spring, at times when other work is not demanding your attention. Always fill the empty crates with boxes bottom up. A form for making crates is a great help, not only expediting the work, but also securing greater accuracy. A stapling machine, while not a necessity, is a great convenience, and will pay for itself in one season. Carriers are made in two sizes, holding four and six quarts, respectively. The six quart size is the one generally

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used. Each picker is furnished with a carrier, and if the distance between the berry patch and the packing shed is somewhat great, he can have two, provided always that he must keep the picked fruit in the shade out of the sun's rays. Half-bushel baskets come nested ready for use. Grape baskets come in a similar manner, except that the handles must be nailed on.

As a general proposition we expect pickers to be reasonably neat and clean, and to take special pains not to soil or stain the boxes and packages which they are using. A good spring wagon with water-proof cover or top, carrying from forty to sixty crates, completes the equipment. We are now ready for that campaign which the ripening strawberries and Early Richmond cherries inaugurate. In certain ways there is a great sameness throughout the fruit season. The hurry and worry and bustle incident to handling perishable goods are always with us. The bad weather or other unavoidable delay of today only intensifies the duties and demands of tomorrow. If possible every patch of small fruit should be gone over each day, and every other day the rows should be picked in reverse order. In harvesting the cherry crop, the field-boss should help to place the ladders and platforms for the pickers. He should always be on the alert that the trees are not damaged. Once I set a boy and girl (brother and sister) at picking the cherries on an Early Richmond—a large beautiful tree. In the course of an hour or two, I came around to see how they were progressing, when lo! they had completely ruined the tree by breaking off the limbs to get the cherries. On another occasion I found two young ladies sweet and twenty—taking it delightfully easy in a nice shady place picking the cherries from the little branches and twigs which they had stripped wholesale from the trees.

Our pickers use baskets and buckets, holding four to eight quarts, when picking from the trees. The fruit is afterward carefully transferred to the proper packages for market. We sell most of our cherries just as we do berries, in crates, and like to see each box nicely faced. For home and near market we sometimes use half-bushel baskets. Plums are put in half-bushel baskets mostly. Extra nice ones sell well in grape baskets, and even in crates as berries are handled. Grapes are always put in the standard grape basket, except occasionally for home demand, when larger packages are used. Of course the picking force is reduced or increased according to the acreage or quantity you have of the different kinds of fruit. With us these "busy days" reach high tide in the raspberry season. Then it is that we call out the reserves. Urgent messages are sent to Time-Check, Seldom-Seen, Stump-Town, Oak-Hill, Dun-

dee and Paradise Alley (aristocratic suburbs of Cedar Rapids), and they have never yet failed to respond.

Before closing, I want to speak of a few things which I term nuisances, running from a mild to an acute type, and are sure to afflict the fruit-grower every season. The three most conspicuous of these are children, visitors and dogs. This is a sort of mongrel classification, but it has the virtue of being easily understood. By children, I mean those too small to do work, from the infant in arm to (say) ten years old. Doting mothers, and loving brothers and sisters will bring along the younger members of the family, occasionally, and what are you going to These little folks when not in the berry patch, do about it? gorging themselves with fruit, or handling and mussing the boxes already filled, make the packing shed or tent their headquarters, and worry the tally-keeper into an early grave. have kept this evil in moderate check by doing an awful amount of scolding. We have a standing rule that no one shall come unless he can pick a certain minimum of quarts per day, but for

obvious reasons we do not enforce it very rigidly.

The fruit season is the favorite time for visitors galore. Long since when visitors come, we promptly turn over to them the keys of the city, and give them the freedom of the farm, and tell them to take care of themselves. Of course, when we have leisure it delights us to entertain them personally. are sometimes inconsiderate. How it exasperates pickers to have a party of visitors precede them in the rows, culling the ripest and finest berries. One of many times I have conducted parties through our vineyard, in its palmiest days, stands out in bold relief in memory. There were five or six in the party, and among them a gentleman of many accomplishments, who was occupying an honored place in the social and business world. He was a connoisseur in the matter of grapes, and had an eagle eye for the finest and most perfect clusters. As we walked down between the rows—on one side the Eaton, Vergennes, Niagara and the Delaware, on the other the Agawam, Herbert, Merrimac and Barry, all at their best—he proceeded to sample the largest and most beautiful of the bunches by picking two or three grapes from each one. I thanked God when we reached the end of the rows. But for courtesy's sake we returned by the way of the Pocklington, Worden, Woodruff Red, Lindley, Salem, Empire State and Brighton, where he fairly reveled with a sort of fiendish delight in his peculiar penchant, and I was compelled in respectful silence to see the beauty and symmetry of nature's handiwork marred and destroyed forever. The heartache and agony of that trip through the vineyard left an impression which time may never efface. In that single hour of

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martyrdom, I must have grown five years older. Yet I knew that it was not done in malice, but in thoughtless ignorance.

Dogs! The dog—the visiting dog—on a fruit farm, especially in the fruit season, I consider a nuisance of an acute type, which must be suppressed. The dog permits the pickers to pet and fondle him, and who wants berries or fruit of any kind gathered by such hands! And he drinks out of the water pail without asking permission, and does other unseemly things. The remedy is a B. B. rifle, using the best Flobert caps. It is both effective and noiseless. It is ungenerous to the owner, who may be a picker, or a prospective purchaser of fruit, and it is dreadfully hard on the dog, but cleanliness and decorum must be maintained at all hazards. Many a prized pug, spaniel, hound and common cur has filled a nameless and unknown grave about our premises. But mind you, that B. B. rifle must be used strictly on the sly.

PRICE OF LUMBER DEPENDS ON PRICE OF FARM PRODUCE.— The increase in value of lumber is attributed by the farmer to a number of different causes, and he often does not appreciate the fact that there has been a very marked increase in price of his own farm produce. Today he can buy as much lumber for one hundred bushels of wheat or corn as he could ten years ago. There are few who would not rather receive forty to sixty cents a bushel for corn and pay thirty to forty dollars for dimension stuff than to receive nine to fifteen cents per bushel and have to pay only fifteen to twenty dollars for the same dimension material. In following up the range of prices during the past ten years, we find that averages show that the quantities of oats, corn, cattle and hogs, which ten years ago cost \$100, would today cost \$174.75, while the quantities of lumber that cost \$100 ten years ago would cost today but \$166.67. To sum up the situation briefly, lumber must advance eight points before it reaches "the trustless altitude of oats, corn, cattle and hogs."

That something must be done right at home to supply the tremendous need for lumber, fence post and repair material is thus forcing itself upon the residents of our prairie regions. Every resource is being drawn upon to meet the demand. Shade trees about homes and in pastures are being cut. Portable sawmills are making dimension stuff and lumber for barns, corncribs and sheds, from cottonwood and soft maple groves and windbreaks. Added to the need for wood on the home place is the great demand for walnut, hickory, ash and other hardwoods by furniture and vehicle manufacturers. Five years ago hickory was sold at \$40 per 1,000 feet in Chicago. The price for the same grades today is \$70.—Prof. H. P. Baker.

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SPRAYING.

J. M. BECHTEL, HAMBURG.

(Read before the Southwestern Society.)

It were better to have assigned this subject to some one who has had more personal success than I have had.

I will give my own experience. Last year, I sprayed thoroughly on May 10th and 20th, with a solution of five pounds copper sulphate, four pounds arsenate of lead and five pounds lime, to fifty gallons of water. This is a good strong mixture. I expected to spray again about July 15th to 20th (it takes me ten days to go over my orchard), but on close examination, at that time, I found my orchard clean and clear of both fungi and worms. On August 7th, Mr. Newhall, of Chicago, went over my orchard and found the fruit so clean, I closed a contract with him for my entire crop of Willow Twigs at \$1.50 per barrel on the sorting board, he to take all wormy and knotty apples, in fact everything but wet rot. At this time, August 7th, there was no sign of defective apples, and it looked like a full crop of clean fruit, and I concluded to take my chances and not spray again.

Two weeks later I saw the worms were beginning to work a little. By September 20th I found I had a good many defective apples, and by picking time, I had about 50 per cent of No. 1 apples, all kinds. Newhall carried out his contract, and got a

lot of wormy apples.

To make spraying a success, it should be done right, and about as follows: First, if for fungi, spray once thoroughly just before buds open. Then spray as soon as bloom falls. Use five pounds copper sulphate, four pounds arsenate of lead, and five pounds lime. Then spray about July 5th to 15th and again about August 10th to 15th. The two last sprayings to be of solution one pound less of each ingredient. If much rain, an extra spraying will be very beneficial. I believe with three good sprayings extra results can be had. There are growers who spray from May 1st until September 15th, and get extra good results. It is absolutely useless to try and raise apples without spraying thoroughly.

This year I had about 600 bushels Jenetons and only a few of other varieties. My Jenetons were all grown on trees about thirty years old, and were sprayed once, all except two trees, which were not sprayed. They were all fairly clean and clear of worms and fungi. Could see no difference between the trees that were sprayed and the two trees not sprayed. This was a Jeneton year. The above spraying is for chewing insects, among which are the codling moth, curculio, canker worm, army worm, tent caterpillar, fall webb worm, grasshopper, currant worm,

etc.; also for fungi.

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HORTICULTURE IN CIVIC IMPROVEMENT.

MRS. J. RUTLEDGE BATES, STUART.

The leaven of Civic Improvement is working everywhere and is so democratic in principle, for the people, and by the people, that it appeals to all. The property owner, the real estate agent, everybody, in fact, is beginning to see that beauty is a city's asset, that can be realized on in a splendid manner. It is gradually dawning upon every one that a nice, clean, well-kept city is money in the pocket of every inhabitant thereof. There is less protest about the taxes involved in better streets, alleys, sewers, lighting, tree planting, in short in the general improvement of the town. The work has broadened in scope until the desire for a better city to live in finds expression in doing, not talking, bringing about the visible manifestation of an ideal of beauty

which I believe is in every human soul.

The ideal in civic art presents a complete fabric of beauty. woven from elements all beautiful in themselves. smoothly paved, well ordered streets, pleasantly shaded, margined with velvety turf, becomes mean when equipped with ugly lamp posts, telephone poles, and water tanks, marring it as a good picture is defaced by ugly scratches. Hence, it is essential that artistic character be given to all these things, for when things of every day use are made beautiful, they serve a doublepurpose, delighting the eye and serving our daily conveniences. The first thought of civic improvement was directed to beauty, but now to make utility, the vehicle of art, is its chief end. Use and beauty have too often been regarded as separate attributes. We used to think things of utility must be common and no matter how ugly. It was an old fashioned custom to isolate all thenice things of the household in the best room which was too precious to live in. But now we make the whole house as beautiful as possible. A forced familiarity with ugliness dulls the taste for beauty, and we must become used to the beautiful, by seeing it everywhere in the most common things, for beauty, at its best cannot be given to the things set apart to wear as a garment of state, as in statues, monuments and public buildings. There are many phases of work done by civic improvement societies, which are everywhere in evidence, and no part of the work is more important than that of horticulture, and no phase of city making speaks more eloquently of the change in American ideals than the growth of parks, playgrounds, city and school gardens, which are now organic parts of the city. Men are becoming so addicted to their own society, that they miss a good many improving and pleasant companionships such as Mother Nature has for them, if they would visit her with eyes to see and ears to hear.

It is for the moral and mental as well as for the bodily well-being of the citizen that he shall go to the earth to renew liking and confirm kinship with other and more delicate forms of life than his own. He may be slow to read the lessons, in the leaf, flower, grass and tree, and may not want to read them after he knows they are there. But, under the sky, he is free from many ills that beset him under the ceiling, for happiness is largely dependent on the physical state, and man is not at his best in the shop, the office or the drawing room. It is then worth while to have a bit of ground and use it if only to forget stocks and crimes, bills and governments.

I think in the beginning the sum total of desire is a lawn. A smooth velvety lawn is a delight to the eye, look we never so longingly on nature in the wild. So whatever else we have or don't have, let us have grass. It is a symbol of plenty. Our soft breasted earth yields her treasure of grass to her children for the Other crops are planted by men's hands, they have sown, watched and weeded, plowed, harrowed, watered, but grass is the world's freest gift, and the freest is often the finest, like the stars of the night, and the splendor of the sunset. Grass grows in the tropics and arctics too. In the warm darkness where the seed has sunk, strange chemistries go on. The miracle of a spear of grass is not less than that of the revolving worlds. So have it near your eye, let it creep up to your door, for it satisfies all the senses. Content shines in the eye of the gardener when he sees its beautiful green. Each hillock of drying grass utters fragrance and has a lesson for us. Every blade has had its day, and come to the end of it in fullness of life and strength.

That strength shall pass into the fleetness of horses. Sheep shall eat, and clothe us with the warmth the grass borrowed from the summer; and meek-eyed cattle give us back food and drink.

However perfect grass cannot be grown over night. In England they have a saying it takes three or four centuries and he is a benefactor who makes two blades grow where one grew before. And the lesson? That we, like the grass, fulfill our destiny by giving of ourselves for others, and heeding it, obey the law of

conscience and necessity. So in building our city beautiful let us have grass, plenty of it.

As most cities in the United States are a rapid outgrowth of villages, street trees form an important part of the creed of village improvement. To preserve old trees, plant new ones, to teach, the town can never grow big enough to slight them, or to let business elbow them away, is to insure good trees and large ones for the future city.

The picture of a beautiful town is not complete without treelined avenues, tree arched streets, with the play of light and shadow on the ground, the softening of the sunlight glare, the hardy chronicle of the season's progress, written on the trees where all can read it.

If the tree then be so important a factor of beauty, why in many towns has its value so long been disregarded? Happily its civic value is more and more appreciated, both from the point of beauty and utility, yet not so much as it should be, perhaps because its success requires patience and more of the altruistic spirit than in any other improvement. A man paints his house, lays a new side-walk, plants flowers and grass and holds his head higher, because he has done something primarily for his own good, secondarily for his neighbors. But as to planting trees whose full beauty he may not live to enjoy is a demand upon public spirit which somewhat staggers him.

After all we are creatures of nature, and no argument is needed to convince us we must have trees. So the question to be briefly considered, is the how and kind of trees and the care of them. Opinions differ regarding the proper responsibility for trees on city streets. The one view vests all rights and title to the tree in the owner of the property before which it stands. The other asserts that the trees belong to the city at large, that the individual has no right to the tree in front of his house, that he cannot say whether it shall be removed or pruned, than can any other citizen.

The theory of municipal ownership of trees is spreading as regard for civic æsthetics spreads. This is the theory of such cities as Paris and Washington, D. C., also of the general law of Massachusetts. In some cities the street trees are in care of a special commission, in others they are in charge of the Park Commission for tree planting. Another argument for tree planting, if one were needed, is the sanitary value of trees. The foliage inhales carbonic acid and exhales oxygen. As a result the diseases incidental to heat are less prevalent in streets where there are large trees. The leaves absorb also the poisonous gases generated by the decomposition of animal and vegetable matter in hot weather. Their shade is cool and there is less direct and less reflected heat, while in winter the trees actually radiate warmth.

So the beautiful city can not do without trees, trees graceful, strong and numerous. Let us then in our thought of trees and its expression yield ourselves to the frame of mind which was Ruskin's when in exclaiming, "What a thought that was when God made trees!"

In American cities several general decisions of importance have been reached. An early discovery is, that no city can count upon getting more than suggestions from the experience of another. When it has been said that street trees should have symmetry of growth, stateliness and hardiness, one has said about all that can be of general application. The tree commissioner of Washington, D. C., began with thirty varieties; now all the trees in the city can be included in ten varieties. One point to be considered is, that impressiveness and charm are better secured if one variety on a thoroughfare be used. A street of elms is pleasanter to the eye than one of elms and maples mixed. A street of maples loses its symmetry when horse chestnuts or box elders are interspersed. In so brief a paper, it is not possible to enlarge on the kind of trees to plant. Among the evergreens may be mentioned the cedar, white and red, the balsam. spruce and hemlock. Some kinds of fruit trees are well suited to serve as adornments to our homes. An apple tree laden with rosy and fragrant bloom in springtime, is indeed a lovely sight. When the heat of summer comes, what a comfort is the shade of its spreading branches and when autumn colors and mellows its fruit, it is still more attractive. A cherry tree with its shower of bloom and later its glossy red fruit is a charming tree in our yard. Now and then a pear tree serves a good pur-Peach trees do not flourish in a lawn; plum trees are Quince trees do very well in grass and its flowers, better. foliage and fruit are ornamental. But as the world loves a lover, so all the world loves the elm, with its graceful, swaying branches. And the maple? Listen a moment.

Tapping the sugar bush are magical words to the country girl and boy. The winter which at first was so welcome with its miracle of snow, the joys of skating and sleighing, begins to pall upon the taste by the last of February. Then there comes a day when the south winds blow blandly, a suggestion of Spring is in the air, the bare trees show a flush of living red and every spray grows heavy with swelling buds. Many of you in the dear old days of long ago have heard the father say, "Well, boys, we had better get the sap buckets down from the loft and wash them, for if this weather holds, we can soon tap the sugar bush." Oh, joy supreme! You all remember how it was done, the tapping and the gathering of the sap.

As the evening shadows lengthened and deepened, how delicious was the odor of that boiling sap permeating the woods further than the fire light pierced the gloom. You poked the fire to send the sparks upward, you piled on wood, you added sap from the barrel near by, you removed the scum from the boiling mass, and as the evening wore on, you drew closer and closer to each other as you told wonderful stories of Indians and panthers and bears, (not Teddy bears, either) that roamed the woods when father was a boy, and in your little hearts was the suspicion they were not all gone yet, for everything seemed possible in the night shrouded woods. Oh, don't you remember the dear old sugaring days, the dearest ever, and as you remember, why not make those halcyon days of your boyhood possible for your children's children, by planting maple trees?

What plant we in this apple tree?
Buds which the breath of summer days
Shall lengthen into leafy sprays,
Boughs where the thrush with crimson breast
Shall haunt and sing and hide her nest.
We plant upon the sunny lea,
A shadow for the noontide hour,
A shelter from the summer shower,
When we plant the apple tree.

The fruitage of this apple tree,
Winds, and our flag of stripe and star
Shall bear to coasts that lie afar,
Where men shall wonder at the view,
And ask in what fair groves they grew,
And sojourners beyond the sea
Shall think of childhood's careless day
And long, long hours of summer play,
In the shade of the apple tree.

As your desire for the beautiful city grows and the taste develops, you will want to make hedges and mask your house with ivy, honeysuckle, wistaria and woodbine, for in our horticulture study we must not forget the part played by the soft and clinging green of the vine. It softens lines, gives beauty to shadowy corners and will draw its protecting and beautifying cloak around a hideous exterior, making it fair and cool as a sylvan retreat, decking its ugliness with clusters and garlands of flowers. Still our city is not complete and you are not yet content, for there are flowers in endless variety of color and beauty.

It was Lord Bacon's idea that a garden should always be in bloom, and that is quite possible. We put bulbs in the earth in the fall to greet us as soon as the winter snow is gone; the crocus, white, blue and yellow, hyacinths with spikes, deliciously fragrant. In May comes the columbine, lily-of-the-valley; in June the garden will be in full flower, sweet peas will perfume the air, morning-glories greet the sun before you do. The roses

unfold their velvet leaves to the butterfly, lilies will arise to teach a lesson of humility and graciousness, the nasturtium reflects the light and warmth of summer. Color flows in high tide across the earth in July-zinnia, spiræa, geranium, balsam, phlox. etc. August continues most of these blossoms, the hydrangea puts out bunches of pink and greenish white, the sunflowers and hollyhocks lend of their pomp. September continues the pageant with canna, gladiola, ageratum, cosmos, verbena and salvia make a blaze of color in dark places. dahlia and nasturtium are still in our country garden. October the flowers are in rivalry with the trees, for the hillsides are gardens, the maple, beech, oak, sumac, paint the scene with splendor. The asters and goldenrod add touches of warmth to the chilling fields. The last rose of summer may be found blooming in October, and not alone, for October is the month of chrysanthemums, and the glory of these lasts into November. The only color left us when bleak December comes is the brilliant red berries of the bittersweet.

I've carried you briefly through a year of flowers, for those who have a bit of ground, and for those who are not so fortunate there are window gardens that, especially in cities, give such a brightening touch. Steps, window ledges, stumps of trees can all be utilized for the boxes, old kettles, etc. In the old world this kind of gardening is more in evidence than with us. London, because of window gardens, is not a flowerless desert, and in Germany there is the same glad decking of the streets. If grim London thus adorns herself, one may be sure that the smaller communities in England fairly rival in luxuriant window gardens. Success, of course, depends on the people's natural love for flowers, and skill in gardening. Liverpool and Glasgow encourage window gardening, as a function of municipality. In Glasgow, 500 window boxes were prepared and loaned to the more densely inhabited districts, that color and brightness might be brought into the dark seaborn city. In Hamilton, Canada, prizes are offered for the finest window gardens. In our own cities and towns we now have many boxes filled with bright flowers and running over with vines, but there should be more.

From the esthetic, let us for a moment glance at the utility side of horticulture in civics. Much can be done with your little vegetable garden. First, if you have a temper you can wreak it on the weeds, for they, like the poor, are always with you. In a degree you can outwit adversity; a small spot of ground will keep a family for a month. The family may complain a little and desire to exchange some of the crop for eggs, dairy products or champagne, yet there would be variety. You should have asparagus, lettuce, celery, tomatoes, corn, beets, peas, beans, for a hot day a cucumber, for a cold one a pepper.

I know a man who raises on a bit of ground, 25x50 feet, all he needs and gives to his neighbor, but he cultivates it like a Chinaman, and every foot is a possibility. As an auxiliary of the civic work, there seems no broader and better work than using the vacant lots in every town for horticultural purposes, so many benefits are there, to the individual and the community. The vacant lot idea is helping the crusade against consumption. Many persons have recovered health and improved their financial conditions, owing to nutritious food, shelter, health giving exercise in fresh air and sunshine, thus bringing an improved mental condition.

We of the smaller cities and towns can have no idea what all these gardens mean to the poor people of the large cities. But the best results are reached where the school garden has been made a permanent part of our educational system. It is acknowledged by sociologists that to maintain the stability of our government and secure the welfare of our people, we must manage to keep a large part of our population on the land. But few can have farms, many have gardens. Statistics of the result of one year's experiment in vacant lot gardening in Philadelphia is, gardens for 800 families, total value of products \$52,000, average per family \$165, number of people receiving benefits from the gardens, 4,000.

The idea of school gardens, while new in America, is not to Ten years ago, Austria had 8,000 many foreign countries. school gardens. France has 30,000 of these schools. all of them belong to the primary grade. Indeed in France. a man who lacks a knowledge of horticulture and the ability to teach it cannot receive an appointment as master of a school. Sweden granted the school garden upon her public school system more than thirty years ago, and each of her public schools have been given from one to twenty acres of ground for gardening purposes. Russia has taken up school gardening with energy. In 1895 the 227 school gardens contained 111,000 fruit trees and 250,000 forest trees. The school idea originated in Germany, the nation to which the world is indebted for many advanced educational ideas. In the city and town schools, the garden is confined to botanical and decorative flowers. In the country the schools rival the agricultural colleges in the scope of their work. The school garden idea in America is yet in its incipiency. Massachusetts is making great progress. New York City, Cleveland, Detroit, Chicago, Minneapolis and St. Paul are making efforts in this direction, which have already improved the knowledge of the pupil in regard to the common things of life, the things that tend not only to the individual good but to national prosperity.

Emerson said: "I believe in a spade and an acre of ground.

Who so cuts a straight path to his own living by the help of God in the sun and rain and sprouting grain, is the universal working man. He solves the problem of life, not for one, but for all men."

A valuable phase of horticulture in civics is the help it may be in the solution of sociological questions in bringing the occupants of our jails in close touch with vacant lots,—give the criminal a spade and a vacant lot that he may dig his way back to his self-respect and manhood. Horticulture will play a part in the solution of one of the greatest problems that confronts this nation, the race problem. An article in the Outlook for March 31, 1900, on "Village Improvement Among Negroes," is a valuable one in social statistics, by R. L. Smith, who is probably the only colored man in the United States who has twice been elected to the state legislature by the vote of the whites. His work for the moral and material uplift of his race began years ago after reading an article on "Village Improvement" in the Youth's Companion. The first year's work was discouraging to the mortgage system. The black people had no money with which to better their conditions. Mr. Smith formed an organization, pledging the members to raise all possible supplies on their own land and to co-operate in buying seeds and trees for cash. The story, graphically told, covers a period of nine years.

Today there are more than eighty-six branch organizations with a membership of 25,000. The people who ten years ago had scarcely a dollar's worth of taxable land now pay taxes on over a million dollars in land and live stock, and the organization has not furnished a criminal. Such results are startling when we consider the small beginning and the apparent hopelessness of it.

Who shall say that thought is not a mighty, resistless force?

I gave a beggar from my little store of well-earned gold,
He spent the shining ore,
And came again and yet again, still cold,
And hungry as before.
I gave a thought, and through that thought of mine,
He found himself a man supreme, divine,
Bold, clothed and crowned with blessings manifold,
And now he begs no more.

No man, however innocent and well grounded in virtue, could live long among ash-heaps in the miserable areas of the slums, without suffering a moral change. If any man doubts this, let him analyze his thoughts some hour when his only land-scape is a pile of cinders, old rubbish and brick-bats. It makes him feel vicious.—J. A. Callison.

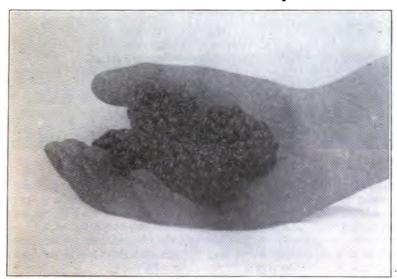
THE LUCRETIA DEWBERRY.

W. S. FULTZ, MUSCATINE.

To successfully grow the Lucretia Dewberry in Iowa requires great care and peculiar treatment. Being rather tender it requires to be protected during the winter and when properly managed and given winter protection it is a profitable berry to grow.

The first four or five years that we tried to grow it we made a failure, notwithstanding the fact that we tried various methods of treatment. Three years ago this fall we hit upon a method of treatment that we have since followed with decided success.

We plant in rows seven feet apart, and set the plants five feet apart in the rows. The first year we planted potatoes with the dewberries as a nurse crop and in the fall after the potatoes were dug the dewberries were covered with a mulch to protect them during the winter. The following spring the vines were raised above the mulch and clean culture given during the summer. The following fall after the leaves had fallen the vines were all cut away from each hill except six, three on each side. These six vines were cut back to three and one-half to four feet long and were then drawn down lengthwise of the row, three each way from the hill and fastened down with a couple of small stakes.



LUCRETIA DEWBERRIES.
Half natural size.
Photograph by F. L. Fultz,.

This drawing down of the vines is done to bring down or straighten the bow that grows in each vine at the hill so as to reduce the amount of mulch needed for covering and to give better protection by having the vine close to the ground.

This small slender row of vines is then covered over with earth or mulch of some kind. We have covered with earth by throwing it over the vines with a plow, which is the most rapid way of doing the work. We have also tried various kinds of mulch and now cover entirely with forest leaves which are held in place with a little earth thrown on the edges of the row of leaves by a small seven-inch plow. The leaves should be about three inches deep over the vines and just wide enough to properly cover them. When trimmed and drawn down close to the ground it requires but a small amount of leaves to properly cover the vines. Care should be taken that there is no frost in the vines when stalking down, as then they are very brittle and apt to break.

The second spring after planting, good strong posts are set at each end of the rows, the posts to extend two feet above the ground, and well braced. Stakes are driven in the ground every fifteen feet along the row, the stakes to be as high above the ground as the posts. A No. 12 wire is then strung over the rows



THE LUCRETIA DEWBERRY READY FOR MARKET.

and fastened to the posts and stakes. The wire should be at least twenty inches above the ground. In the spring the little stakes that hold the vines to the ground are pulled up and the vines are raised and tied to the wire. The leaves are allowed to remain on the ground as they save hoeing by keeping down the weeds in the row. A horse and plough or cultivator is used to keep the spaces between the rows clear of weeds.

The object of tying up the vines to a wire is twofold. First, to keep the berries off the ground, and keep them clean, and second, to keep the bearing vines high enough from the ground so that the new growth will not over-run and smother them.

We find that it is very detrimental to their bearing qualities to allow the new or current year's growth to overrun the old or bearing vines. The treatment for each succeeding year is the same as for the second year.

It must not be supposed that this treatment of the dewberry can be given without labor. It requires a large amount of care and labor to raise any kind of fruit and the dewberry is no exception.

HORTICULTURE IN OUR RURAL SCHOOLS.

A. T. ERWIN, AMES.

To study arithmetic the student must first become familiar with figures. In the same way the introduction of horticulture in our schools must be preceded by a change in the courses lower down the line. The fundamental object of education should be to place one in touch and in sympathy with their surroundings. Somewhat less than half of the total population of the United States belongs to the farming class. Have you ever stopped to think how little attention has been given to shaping of our country school system to meet the needs of this important class?

If it is the purpose of an education to place one in touch with the environment, then what studies should enter into the course of study for the country boy and girl? What are his surroundings? Manifestly it must include something about the plants, the trees, birds, insects and animate life in general about them. As it is, we study about the formation of the earth, but nothing about our own soils. We have botany, geology, zoology. What we need at this stage is not so much the scientific classifications and ologies—we need to study not books about trees so much as trees themselves.

We are much concerned about the migration of our young people from the farm to the city. Professor Bailey mentions one example. He visited a rural school of forty scholars, in New York state. He asked how many were born on the farm. Thirty-nine hands went up. Next, How many want to stay on the farm? The one hand went up and the other thirty-nine went down.

In too many instances the teacher reports for duty Monday morning, locks the door Friday afternoon and makes a straight line for town. In this case the real life and atmosphere of the country is not entered into. On the other hand, there is a strong likelihood of both the course of study and the instructor tending to lead the student townward.

This is vitally wrong and the present attitude of our young people is the inevitable result of the system. The points of emphasis and the centers of interest are in the wrong direction.

"The happiest life has the greatest number of points of contact with the world and it has the deepest feeling and sympathy for everything that is." But at present the farm boy is not brought into relation with these points of contact. Our educational system is shaped too much in the interests of the professions. Without in any way decrying the importance of this class I am firmly convinced that it must be modified to meet the needs and ends of the farming class.

The first step must be in the lower courses and before the age of teens is reached. It will not be in the direction of giving out practical information about different crops, but rather in the presentation of subjects that will "awaken an interest in the things with which the farmer has to do, for a man is happy only when he is in sympathy with his environment." We must first cultivate an interest in the common things about us and, second, cultivate the power of observation. We must not make the mistake at this point of beginning to stuff the child with mere practical information. The child loves plants because they are plants. To him the tumble weed is just as interesting as a stalk of corn. The first step is to develop this interest and to secure the right point of view. The point of view determines the current of our lives.

Once we secure this point of view with our young people, we will then have a receptive mind to work upon and it will then be possible to create a sentiment in favor of agriculture and to increase the farmer's respect for his own business.

Now that we have the attentive ear we can introduce various phases of agriculture among which horticulture will have a prominent place. This system will include not only the three Rs, but also the three Hs, the hand, the head and the heart, and they will all be used for promoting the cause of agriculture. Its sentiment is well expressed in the following poem by Professor Bailey:

I Teach.

The earth and soil To them that toil, The hill and fen To common men, That live right here;— The plants that grow, The winds that blow. The streams that run In rain and sun Throughout the year;-And then I lead Through wood and mead, Through mold and sod Out unto God With love and cheer. I teach!

AN EXCELLENT TREE WASH.

F. O. HARRINGTON, WILLIAMSBURG.

(Read before Southeastern Society.)

In use at Evergreen Farm as a borer preventive in the summer. With three quarts of water add one pound of strong laundry soap, though whale oil soap would be preferable (home made soft soap is all right, using a little more of it), boil until dissolved. While hot, pour upon about three pounds of good unslacked stone lime in some receptacle holding about five gallons. The heat of the slacking lime will cause rapid foaming of the soap suds, which if not interfered with, would rapidly empty the vessel of its contents. To guard against this, have on hand a little cold water and a dipper, also a paddle for stirring the mixture. Keep stirring constantly, and where danger from foaming occurs, slowly pour a little water from dipper into the mixture, using no more than necessary to cause some subsidence of the uprising. This will occur several times, and stirring and adding of water must keep it within bounds.

During this period, or at least while still quite hot, add from three-fourths of a pint to a pint of crude carbolic acid, which should not cost more than fifty cents per gallon, and which will readily incorporate with the mixture. Not more water should have been used in slacking than to leave this mixture of the consistency of thin cream, so that it will flow readily with a paint brush. If now it is obtainable, add to this mixture an equal amount of the refuse from an aceteline light machine, or plant, this being the dissolved calcium carbide. This alone is an excellent wash, and with the other mixture adds greatly to its durability on the tree bodies. Experience has shown that too thick wash, that is, not thinned quite enough, or by going over too many times with the brush, makes so thick a coat that it -cracks and scales off, while a thinner coat will answer for the desired effect, and remains more firmly attached, and even severe rains do not readily wash it off when once well dried.

Where the calcium carbide refuse is not obtainable the other portions of the wash can be used independently, possibly a little less carbolic acid should be used, but the mixture is preferable. While using in orchard, occasionally stir up well, and as the latter portion of the wash becomes a little thick, as it will always do, add a little water with thorough stirring, remembering the caution given above not to use it too thick. In applying, dig down around the crown of the tree two or three inches, scrape off adhering soil, and apply wash with medium sized paint brush, from bottom of the hole to the forks of the top, and as much higher on the limbs as you choose.

Apply preferably about the first of June, but any time from

the twentieth of May to the first of July will answer. As may be readily understood, this wash is quite caustic, and very deadly to fungi, or insect life, at any stage, but I have never seen the slightest injury to the tree bark or even small trees newly set. If there are borer's eggs or young larvæ their destruction is quite sure, and if eggs have not been laid already the miller will not thereafter, in her life cycle, lay them upon a surface of such a pungent compound.

I used to have a considerable trouble with the borers in my orchards and lost some trees, and others much injured in spite of very careful examining of the trees by my own eyes and hands, but in the last half dozen years, with the use of this wash, I have little trouble and less loss, and though all the trees are examined each year, yet very few borers are found, and the use of this wash leaves very clean, healthy looking wood on the tree trunks, and I would recommend its use for winter protection against the sun, applying in November, unless with small trees one uses the wood veneer protectors, which afford excellent protection in this respect, as well as to guard against rabbits and the meadow mouse.

Horticulture includes forestry, landscape gardening, fruit-growing, vegetable gardening and floriculture. I might say the cultivation of plants, without regard to the uses made of them after grown. It differs from agriculture in that it relates to plants only, while agriculture includes plants and animals. A better division of the subject would be, Plant Industry, and Animal Industry.

YELLOW OAK.

The Yellow-bark Oak (Quercus velutina, Lam.) is widely distributed over the state, though it is not found in the north-western counties. It grows generally on dry, gravelly ridges and upland bluffs. The tree received its name from the yellow color of the inner bark. It belongs to the black oak group and the acorns require two years to complete their growth.

The tree is frequently mistaken for a Scarlet oak. Its leaves resemble those of the Red and Scarlet oaks, but are more leathery to the touch and have a shining glossy surface. The petoiles are long and slender so that the leaves move freely in the lightest breeze. In autumn they turn a yellowish brown and do not take on the crimson of the Scarlet oak.

The bark is rich in tannin, and is sometimes used as a dye. The wood is of value for the same use as that of the Red oak.



YELLOW OAK, (Quercus velutina, Lam.)
Photograph by B. Shimek.

The Editor's Page.

March to the gardener is a month full of hope and promise of brighter days; but while the sun is playing hide and seek with the clouds he must be ever watchful to maintain the right temperature in his glass houses. Plants will grow more under a March sun than in the three preceding months.

The window gardener will now begin to feel the need of more room to strike cuttings, sow seeds, and to start plants into growth that are stored in the cellar; such as fuchsias, hyacinths, spotted callas, and other bulbs and plants for spring decoration of his windows. A good hot-bed is a cheap substitute for a greenhouse, and is a much better place in which to start plants and seeds into growth than the window.

If the hot-bed is made ready for sowing seeds by the 15th of the month it will be early enough for central Iowa, for either bedding plants or vegetables. It takes about eight weeks to grow tomato plants from seed to blooming size, and we cannot plant them in open ground, without protection, much before the middle of May, or they may be injured by late frosts. Three or four sash will be large enough bed to supply the wants of an ordinary family. It is well to have the heating material in proper condition, for a cold, inactive bed will cause you a good deal of anxiety if the thermometer should suddenly drop to near zero. Fork over the manure several times so as to get the pile into a lively fermentation. If the manure is dry, wet it at each turning. If you make the bed above ground, which is the easiest way, make it two feet wider and longer than your frame so there will be room to bank up around it.

It is much better to divide the frame into two compartments, so as to better regulate the temperature, by ventilation, to suit the different kinds of seeds and plants. If the seed is sown in the bed, put in four or five inches of soil. For radishes and lettuce that is the better way, but for other seed, we prefer to sow in flats. These are boxes three inches deep, twelve inches wide and about eighteen inches long, or any size that will fill the space under the sash. When the seed is sown in boxes, two inches of soil will be enough to catch and hold the steam and gases from the bed that would injure the young plants.

During cold frosty nights the glass must be covered with

shutters to retain the heat. These shutters are made of half inch lumber, and should be the same size as the sash. On beds twelve feet long (four sash) boards may be used without nailing them together. When an extremely cold night or storm comes the whole bed should be covered with hay or straw to keep out the frost. This covering may remain on for a day or two without injury to the plants, but do not neglect to give air, or sun light at the earliest opportunity.

If the bed should get cold on account of the heating material being too dry, or from long continued use, the heat may be increased by making holes in it with a pointed stick and pouring

boiling water into them and closing the holes again.

Now that your hot-bed is ready for the seed, what varieties to plant will be the next thing to determine. There are so many different varieties in the catalogues that it takes some experience before one can select those best suited for forcing or

planting in the open ground.

The best lettuce, of the curly leaved sort, is Grand Rapids, or the Black Seeded Simpson; of the varieties that form heads, we prefer the Black Seeded Tennisball. Trianon and White Paris Cos are good sorts for those who like Romaine lettuce.

The best radishes for forcing are Early Scarlet Turnip,

French Breakfast and Wood's Early Frame.

* * *

Did you ever try to raise those big yellow onions that you frequently see in the stores? Sow a packet of Spanish Globe (Prizetaker) in a couple of flats and put them in the hot bed. When the ground gets warm you can transplant them. It is easily done and about as fast as you could clean the weeds from rows when the seed is sown in the open ground.

Sow in flats Jersey Wakefield and Early Summer cabbage; Extra Early Erfurt cauliflower; New York eggplant, and Ruby King peppers.

But don't fill your hot-bed entirely with things to put into your stomach; there is something else about you that needs nourishment also. So save a place for pansies, petunias, verbenas, phlox drummondi, zinnias and other favorite flowers that you want to start early to plant in the garden.

For a propagating box, fill a flat three inches deep with clean sand; press it down firmly, keep it wet and place in the hot-bed. Cuttings will root as quickly in it as in a florist's propagating bench.

Undesirable varieties of fruit trees can be easily top-worked from March to June, so there is no excuse for any one growing poor, unmerchantable fruit. Grafting is so simple a process that any person can learn how to do it successfully in a very short time. The apple, plum and cherry yield readily to this process of the gardener. A cleft graft in a stock two or three inches in diameter will grow more readily than a whip graft in a branch half an inch in diameter, on the same tree. The graft in the larger branch will give you more fruit in less time, but the graft in the smaller branch will probably live longer and be the best in the end. The reason for this conclusion is that: When a branch is cut off the wood remaining never unites with the scion placed on it; the union is in the new growth that is made around the old cut. When this branch is heavily loaded with fruit it may break off during a storm. It is a good plan to keep these branches cut back so as not to get top heavy, and to put grafts in smaller branches to take the place of the larger ones when they fail. We have had cherries that were worked on branches three inches in diameter that produced crops that paid for the trees and the space they occupied in a few years.

The Annual Report will be ready for distribution in April.

IN MEMORIAM.

Robert P. Speer died at his home, near Cedar Falls, on February 2, 1908; if he had lived until the 25th he would have celebrated his eightieth birthday.

Mr. Speer was born in Westmoreland county, Pennsylvania, in 1828; where he lived to early manhood and attended the primary schools of his native county, then enrolled as a student in Allegheny College, in Crawford county. At an early day his parents, John C. and Nancy (Peterson) Speer, moved to Scott county, Iowa, where a younger brother of Robert still lives. Robert P. located in Black Hawk county in 1853 and has been active in many enterprises to promote the growth and development of Cedar Falls in the half century he has lived there.

In 1855 Mr. Speer was married to Miss Miranda J. Seavey, a teacher in the public schools of Black Hawk and adjoining counties. There were four children in the Speer family: Mrs. J. E. Walker of Fullerton, California; Irving of Sanborn; Harvard of Peel, Washington; and Mrs. Evelyn Lee of Cedar Falls. Mrs. Speer died in April, 1907.

In 1862 Mr. Speer enlisted in the Iowa Volunteer Infantry and was elected captain of Company B, Thirty-first Regiment. He wrote a brief account of the battles his company and regi-



Very Gruly Jams. R.P. Speen.



ment took an active part in during the campaigns of Vicksburg, Lookout Mountain and Missionary Ridge, and at Atlanta, which was published in the *Cedar Falls Record* in 1904. At the close of the war he returned to his home and engaged in general farming, nursery and experimental work on a farm of 140 acres which he bought near the city.

In 1876 Captain Speer was elected a member of the Fifteenth General Assembly; he also served one term as trustee of the Soldiers' Orphans Home, located at Davenport, and of the Agricultural College at Ames. In 1888 he was chosen director of the Agricultural Experiment Station, at Ames, and served as the first director until 1891.

Captain Speer has been an active member of the State Horticultural Society for thirty years. In 1883 and 1884 he was elected president of the society, and has served it many years as director from the eighth fruit district. Mr. Speer was a close student of plant life and has read many carefully prepared papers before the society giving the results and conclusions of his experimental work in testing the hardiness and adaptability of fruits for northern Iowa.

Mr. Speer had a strong personality, which gave him leadership in every enterprise with which he was connected. He was a kind neighbor and true friend, quick to act in any emergency. His whole life has been a record of ceaseless activity and afterfour score years of faithful service he sleeps quietly "beneath the low green tent whose curtain never outward swings."

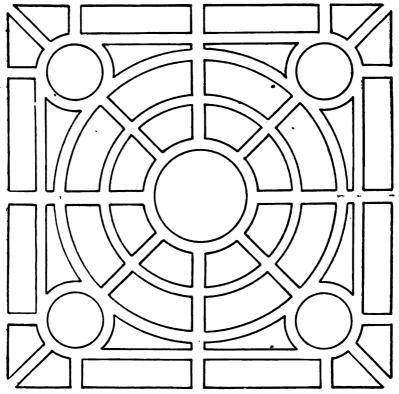
THE FLOWER GARDEN.

In caring for the flower garden we have found it convenient to divide it into two sections, one for annuals, and the other for biennial and perennial plants. The first section must be planted every year, the other one only needs renewing occasionally. To avoid as much as possible the heavy labor of digging the ground with a spade or fork, it has been our practice to plant the annuals in the vegetable garden where this work can be done with plows and harrows. Our vegetable garden contained one-half acre, it was four rods wide and twenty rods long and was located on the lawn, near the house. The end nearest the dwelling was planted to annual flowers, bulbs, and tender bedding plants.

We fertilized that half acre every year with about twenty wagon loads of well rotted barnyard manure and plowed it under just before the ground froze in the fall or early winter. Some of the advantages of fall plowing are: it exposes the subsoil to the action of frost, which helps pulverize it; it disturbs

insects that hibernate in the ground and kills many of them; the soil will pack firmer with less labor and make a better seed bed than when it is plowed in the spring.

During the winter months we make our flower garden on paper. I submit a plan of one of these gardens that is four rods square, but can be made of any size desired.



Plan of a garden 66 feet square, drawn to a scale of 16½ feet to the inch.

In the spring we cultivate the ground thoroughly four or five inches deep with a cultivator having small shovels, then harrow and clod-crush with plank until the soil is as fine as sand that has been sifted for mortar. By using a cultivator with small shovels you can thoroughly mix the manure with the soil and leave it and the aerated soil near the surface within reach of the roots of young plants and they will grow vigorously from the beginning. By having the soil fine and firm it does not dry out so quickly and makes a much better seed bed than loose,

lumpy soil. I have seen flower beds made much like you would make a feather bed, the soil was so loose in it that if you should step on it your foot would sink in over the shoe top. A flower bed made like that might do very well early in April when the ground was wet and the air full of moisture, but it would be a failure in June when the ground was dry and the air warm. Many a plant has suffered from such treatment and refused to grow until rains settled the soil about its roots.

As soon as the soil has been worked into proper condition for a good seed bed and before a rain comes to settle it, I take two or three stakes, a garden line, rule, wide shovel and steel rake and lay off the ground according to the plan made in the The design may appear complicated, but is very easily transferred and the tools mentioned are all that are necessary to do the work. Put a stake in the center of the garden, measure the proper distances for beds and walks and strike the circles with the line. For the straight lines draw the cord tight between stakes set at the outer edge of the garden. We usually make the beds four or six feet wide, and the walks twenty-four to thirty inches wide and about two inches deep. The soil that is taken from the walks is thrown on the beds. We then rake the beds nearly level, leaving the center one or two inches higher than the outer edge so the water will run off slowly during a heavy rain. We level the walks with the back of the rake. The garden is then ready to plant.

We usually put cannas or tall growing plants in the center and grade down to low border plants toward the edge of the garden, though this is not essential, as much depends on the location and point of view. It should be arranged to harmonize

with its surroundings.

In recent years we have sown nearly all seeds in flats and then transplanted them to the garden when the season was well advanced. By this method we avoided the first and second weeding that would be necessary to keep the garden clean when the seeds are sown in the beds. The cost of weeding will pay for the time required to transplant from flats and then the cultivation can go on without delay and the weeds never get a start if the soil is gone over once a week with a rake. It requires some experience in gardening to transplant all kinds of plants successfully, but it is a more satisfactory method of handling small seeds than sowing them in the open ground, as you can take better care of them, if you have a greenhouse or hot-bed, than when they are exposed to all kinds of weather in the garden.

The varieties to plant is a matter of taste, of likes and dislikes. Zinnias, petunias, phlox drummondi, snapdragons, eschscholtzia, poppies, marigolds and scarlet sage will give plenty of color. Gladiolus, pinks, coreopsis, scabiosa, sweet sultans and asters will supply flowers for cutting. Sweet alyssum, sweet peas, mignonette, heliotrope, and gilliflowers will add fragrance to the garden.

The commercial florist usually plants in straight rows so the ground can be cultivated with a wheel-hoe or horse cultivator, but the amateur will not need more than a small bed of any one kind of flower and will get more enjoyment out of a cluster than when they are planted in straight rows. Taking care of a flower garden is a pleasant exercise and is never considered work.

ASPARAGUS.

S. J. COUNCILMAN, BOONE.

That asparagus as an edible vegetable is not properly known and appreciated in the urban and rural homes of the state, is conclusively proven by the fact that not ten per cent of them have a home supply. This is not as it should be. For among many other are the following reasons:

It is first in the spring to begin business, to which it attends with surprising diligence, until its services are no longer needed because of the arrival of his tardy brethren; gives value received for all the labor and expense bestowed upon it: is healthful and refreshing—a favorite with the cook, to whom it comes as a Godsend in that season of dirth between hay and grass; is a popular dish among the wealthy and joyfully welcomed among the toilers who know its worth, and for each it fills the aching void and satisfies a long-felt want; never gets discouraged at our demands, but honors all drafts, and when robbed of its most promising shoots, smilingly offers a new set the next day; after it is once established in the soil, will hold its own against all comers for fifteen or twenty years, and come nearer "going it alone" than any of its rivals; when employed commercially, will swell the bank account and turn a man into a bloated bondholder faster than any soil product except strawberries.

And yet, with all these credits to its account, it is unknown and neglected by a large majority of planters. To correct this injustice and put it into its proper place at the head of the table, and as a leader in the vegetable kingdom, was the inspiration of this paper.

In the growing of asparagus, soil is first to be considered. A deep, sandy mold with clay subsoil for best results. Failing this, any good well-drained corn land will bring good returns. Prepare by plowing deeply in the fall if possible. If the subsoil is hard and impervious, follow team on the plow with single horse and bar plow, breaking up the ground twelve or fifteen

inches. During the winter, manure heavily, plow under in the spring, furrow out to the depth of ten inches, rows five feet apart, and you are ready for planting.

I prefer year old plants, as it has been proven by experiment that after three years' growth they will outyield two year olds, two to one. Three feet is close enough for plants in the row. Set crown of plants two inches below the surface, firming the earth about them with the foot. Keep the ground loose and free from weeds by frequent use of hoe and cultivator.

Common sense will keep your wife out of the plantation the first year, as she will fear uprooting the plants, but it will need uncommon sense to keep her out the second year, for she will think that a good thing which she covets is going to waste. So you had better build a wire fence so high that she can't get over and so close that she can't crawl through, but if there threatens to be war, pick a few messes some little time apart. The third year turn her loose until the first of June, but don't depend upon her to do the hoeing.

Here is where the foundation for failure is laid in the production of a home supply of asparagus. It absolutely refuses to do business to any extent until it is ready, which is not until the third year at least after setting the plants. Some let grow until the fourth or fifth year.

I use no knife in harvesting; let it grow until seven or eight inches high, and break with thumb and finger at the tender point. Sell without bunching—by the pound. In Boone it is sold no other way. Cultivate or hoe, while picking, at least once a week.

The season should end by the middle of June in this latitude to allow the plants to recoup for the next year's crop. Continue the cultivation and manure once in two years. After killing frost, remove the stalks or you will have trouble with the seeds. After the ground is frozen cut the stubs off with heavy hoe.

. I am growing the Palmetto. There are other good sorts. Am satisfied with this, but shall plant an earlier variety so as to start the season sooner—"The early bird gets the worm."

I have grown asparagus for my family's use for thirty years, and for market, in a small way, for five. I have written this paper more from the standpoint of a farmer or mechanic owning a home and trying to have a home supply of this splendid addition to his bill of fare, than from that of the market gardener. Both methods would be the same. The farmer would need only about one hundred plants, the latter many thousands; but the year lost in growing them, unless a very large number was needed, would many times pay for the plants used.

I have had no fungus disease, or insect enemies, and can therefore give no aid in that direction. Instructions for fighting them will be found in the U. S. Bulletin of Agriculture, No. 94.

To properly cook, boil for eight or ten minutes, turn off, add fresh water and boil till tender; season to taste.

Finally, I will say that in my opinion, the difficulties in the way of asparagus growing are chiefly imaginary, and that any one with a little pluck, patience and perseverance may have it in abundance.

A GOOD GRAPE.—Among all the varieties of the grape, fruiting in my vineyard, there is in my estimation but one that is superlative for dessert use, and its name is Brighton. I have five bearing vines of it, but so eager is the demand for it (about the house) that it becomes a source of disappointment, or an unsatisfied craving for more. I have some other vines in the same row and next the Brighton, that are also a disappointment, though for a different reason, and I have planned to graft these crowns before it freezes up for winter with scion wood of the Brighton. One year's growth from graft on these strong roots should produce bearing canes for the ensuing year. The grafting of the grape is but rarely done, yet it may be, if done in the right manner and at the right time, which is different from many other plants or trees.

In thus commending the Brighton, probably I ought to save disappointment to any one, to state that this grape is nearly self sterile, and in order to have fruit it must be planted near some good pollenizing variety. The Worden and Moore's Early will answer nicely. The Concord might be used, but this variety under some conditions is a little liable to the same fault, so is not so reliable as the others, nor even as many of the wild grapes as pollenizers.

F. O. HARRINGTON.

SWAMP WHITE OAK.

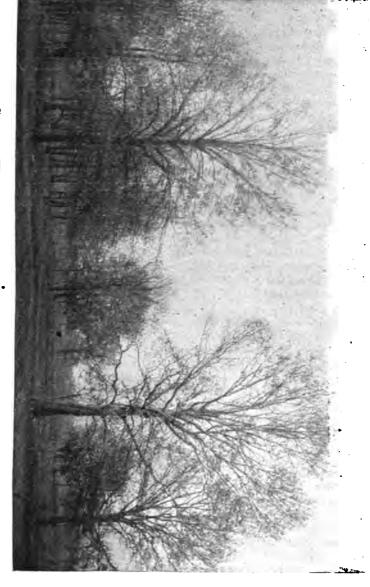
The Swamp White Oak (Quercus plantanoides, Sudw.) is native to southeastern Iowa, growing in low moist ground, along streams from Clayton to Ringgold counties.

It is a picturesque tree in the winter landscape. The lower branches are somewhat pendulous; the grayish-brown bark on the younger growth often peeling off much like it does on the sycamore.

The leaves are coarsely sinuate-toothed; wedge shaped, on short footstocks; dark green above, with white down beneath. The leaves turn yellow in the fall without a tinge of red.

The acorns are sweet; usually in pairs, on a long stalk; not abundant; long, brown, white inside. None of the white oaks bear large crops of acorns.

The wood is fine-grained, strong and elastic, and is used in factories the same as the White oak.



SWAMP WHITE OAK, (Quercus plantanoides, Sedw.)
Photograph by B. Shimek.

RASPBERRIES.

G. D. BLACK, INDEPENDENCE.

When we think of raspberries, our memory goes back to childhood days, when with little tin pail in hand we wandered through the native forest. The pail was not always a necessity, as the luscious berries, by some dextrous movement or slight-of-hand performance, often reached the place and performed the destiny for which they were created without the intervention of pail, dish or spoon. At that time the cultivation of raspberries in garden and field was unknown to us.

Iowa is situated in the center of the berry zone, between the extreme cold of the north and the intense heat of the south, and in the management of the raspberry we must consider summer's heat and winter's cold.

Its season of ripening fills a gap between the strawberry and blackberry, and gives us an agreeable change of diet, as it is not so acid and contains more flavor than the others.

In the red, black, purple and yellow varieties we have such a diversity of flavors that frequently we find persons who like the taste of one variety and dislike that of some other.

The natural home of the raspberry is in the partial shade, and if we keep this fact in mind when planting we may expect better results.

Plant in rows running north and south, and they will be better protected from the noon day sun. They do well in young orchards, but should not be permitted to remain after the trees begin bearing fruit, as they make a harbor for the propagation of insects.

When setting plants, the crown should be placed two or three inches below the natural surface and covered very lightly. The soil can be filled in later after the new shoots have grown a few inches high. If planted too deeply the growth will be weak and slender.

A neighbor came to us with the lament that the plants which he set in the spring were all dying. Upon investigation we found that he had planted them six or more inches deep in a heavy soil. The new growth had been unable to come through, and the piece of the previous season's growth that had been left to serve as handles died at their natural time.

We set plants three feet apart, in rows from six to ten feet apart, so as to leave plenty of room for cultivation between the rows, the distance between the rows depending on the variety planted.

When the new canes are about twelve inches high, the tips

of all except the red varieties should be pinched out. This will cause a low, stocky growth.

The largest and best berries are produced on low bushes, where they are not so easily injured by the wind and heat. By heading the canes low, we get our fruiting wood where it is not so liable to be injured by the dry cold winds during the winter.

It is best to prune branches back before growth starts in the spring. This will increase the size of the berries and facilitate picking. All surplus plants should be treated as weeds during the growing season, and not permitted to remain until pruning time. If clean cultivation is practiced the rows should be mulched with coarse stable manure or litter of some kind. We usually permit the later growth of weeds to grow and remain in exposed situations. We plant corn between the rows to catch and hold the snow as a winter protection.

Anthracnose is the worst and most prevalent disease of the raspberry. It can be controlled to some extent by cutting out the affected canes and spraying with bordeaux, but we think the most practical and cheapest way is to destroy them entirely and make a new plantation with healthy plants as far as convenient for the old patch.

The Older and Turner are the best in quality of all the varieties we have grown, and as they will withstand more cold than others, we recommend them for the home garden.

The Columbia is one of the best purple berries for home use, but winter kills badly here. Berries of the best quality are not the best for market and shipping, because they are more easily injured by handling. The Cumberland is the best we have for both market and home use. The Nemaha, Kansas and Louden are good market varieties, but they are not entirely hardy with us.

The demand for raspberries is seldom fully supplied, and we usually get a fair price, but the picking problem is still unsolved. During the past two seasons we have been unable to get pickers at any reasonable price, and the only alternative we had was to pick them ourselves.

THE GROWING OF STRAWBERRIES.

E. BLAKEMAN, DECORAH.

Of all the fruits grown, in my opinion, there are none that equal the strawberry. They are eaten by all nations, rich or poor, high or low. There is nothing that sells as well in the market or as easily, and generally at living prices. The only wonder is that there are not more people who raise them. One hundred plants is a great plenty to supply a good sized family with

all they need, not only for the table, but to put up for the winter's use, and they are so easily produced. I do not consider it any more labor to raise a crop of strawberries than a crop of potatoes.

In preparing for planting, I would choose a location that was a little rolling, for the reason that if the ground is too level the water is liable to stand on them and cause them to winter kill, the water freezing, causing them to smother. There were a great many in my locality who lost their plants last winter from this cause.

Plant after potatoes or other hoed crop. After potatoes I consider the best, as the soil is more loose and porous. Plough in the fall if possible. In spring disc and harrow until you have a deep, mellow seed bed. Mark ground in rows, four feet apart, or even farther. It is better to have the rows too far apart than too close, as you need the space between the rows for the mulch, which you rake off the plants in spring, and also for the pickers. If the rows are too close, there are a great many berries crushed by the pickers. I would not mark the ground until the day of planting, as they will dry out and cause you some trouble in setting.

When you are ready to set, go to the nearest reliable berry grower and get the kinds which are doing the best for him, and set them not less than two feet in the row. I set with the spade. This is done by forcing the spade into the ground with the foot, moving the handle forward, then put plant in opening back of the spade (which is done by boy), remove the spade, press the dirt firmly against the roots of the plant with foot, and it is done. In this way a man and boy can set several thousand in a day. I do not think there are as many plants lost by setting in this way, as the roots are deeper in the soil, and not as liable to dry out.

After plants are set, start cultivation and go through once a week during the season. One week with fine tooth, next week with coarse tooth. Keep the weeds out of rows with hoe.

When the ground is frozen cover with corn stalks, slough hay or clean straw, let it remain on plants until all danger of frost is past in spring, then rake between rows, leaving a portion on the plants to protect the berries from the soil and keep them clean. This is all you can do for the plants until crop is removed, then mow everything off close to the ground and leave on. Some clear off, and turn plow between rows and drag thoroughly, cultivate same as before, leaving about foot wide of old row.

As to picking and marketing, procure good quart boxes, fill them full of good, clean, ripe berries, take them to your grocer or peddle them as you like best. If the grocer is honest with you, it is the best plan to leave them with him, as in this way you will escape bad debts which you are liable to incur when you sell from wagons.

As to the pickers, I prefer girls, as they are more quiet, and

pay better attention to their work.

In the foregoing I forgot to mention that when cultivating, after the runners start, go the same way every time, as this draws the runners around to the row and does not tear them up as it

would do if they were cultivated in opposite directions.

As to kinds, would recommend Senator Dunlap, Warfield, Bederwood, Haverland, Lovett and Crescent. There are others, but would not advise planting too many kinds, unless in the business of selling plants. For a beginner, I would recommend setting all male or staminate plants, for by so doing, he is absolutely sure of getting berries and avoid the trouble of keeping the kinds separate. I give this advice as I have known several who have been fooled by having set all pistilate varieties and of course getting no crop. The pisitilate berry is a female, and will not produce without being fertilized by the staminate.

In the foregoing I have tried to lay down some rules which,

if followed, will be sure to bring favorable results.

A FEW HARDY SHRUBS SUITABLE FOR NORTHEASTERN IOWA.

JONATHAN BLAND, INDEPENDENCE.

Hardy flowering shrubs develop more quickly than any other trees. In laying out new places, or remodeling old ones, they may be dotted about in groups, or, as single specimens, in nooks and corners which at first look bare, but which will eventually be occupied when other trees and evergreen are more developed.

The best time to plant is early in spring as the ground can be worked. Manure and spade the ground in the fall. To get the best results, it is well to manure between the plants each

fall for the first two or three years.

In my experience here of the last ten years I find the list very small of real hardy shrubs that will stand without killing back in the winter, or that need no protection. Berberis thunbergi (Japanese barberry) is one of the most ornamental and valuable shrubs, remarkable for its dense growth and attractive appearance throughout the year.

One of the earliest to start in spring, it is covered with the greenness of dainty little leaves and a few weeks later with small pale yellow flowers, followed by a crop of fruit ripening into scarlet berries, which remain on the plant all winter. It is one of the best plants either for single specimen or shrubbery,

but what it excels in, in my judgment, is for hedges, ornamental or defensive. There is no hedge plant grown in northern Iowa to compare with it. It will never grow out of shape, if never a knife or shears touch it, whereas most of other plants, planted for hedges, unless the knife and shears are kept constantly at them, are most unsightly, ragged looking objects. The fruit picked in October and rubbed between the hands to bruise the covering and sown outside in drills at the same time will come up the following spring and will make a growth of twelve inches or more the first summer.

Hydrangea paniculata grandiflora is one of the best of late blooming shrubs. The flowers are creamy white with large pyramidal heads, terminating the current year's growth. It comes in bloom the latter part of August. It makes a splendid show in groups or single specimen on the lawn. To have it perfect it needs lots of water. In propagating, green cuttings may be taken in August, take those shoots that are not too robust and only the ends, shorten back the leaves one-third and put in sand under a window sash on the north side of a building; keep close and moist; they root freely.

Lonicera tatarica, white, pink and rose bush honeysuckle, are splendid plants for growing around here. When one mass of flower in May and early June nothing could be more beautiful. They root freely from hard wood cuttings taken any time after new year, cut in lengths of ten to twelve inches, tied in bundles and buried in sand in a cold root cellar until spring. Then planted in rows about a foot apart from row to row, and about two inches apart from plant to plant; plant deep, leaving only about two buds above ground, firm well with feet.

Philadelphus (Mock orange, Syringa) are very valuable flowering shrubs with large white flowers, delightful orange blossom frgrance.

P. coronarius is one of the best known. P. grandiflorus is a native of the southern states, flowers much larger than P. coronarius and just as hardy, roots freely from hard wood cuttings same as the honeysuckle.

Sambucus aurea, Golden leaved elder, makes one of the finest displays we have here. Planted in large groups a mass of gold shows from a great distance. It is unlike any other golden leaved shrub, in that as the season advances the color is more intense, while most other shrubs grow a dirty green. It is very easily grown and propagated. Never plant in the shade, give all the sun possible. It roots freely from hard wood cuttings either put in in the spring or fall. It needs well cutting back in the spring.

Spiræa (Meadow sweet) among the varieties of Spiræas are some of the most beautiful and useful hardy flowering shrubs.

S. anthony waterer, a dwarf variety, covered all summer with large heads of rosy crimson flowers, useful for cut flowers. The more it is cut the freer it flowers.

S. van houttei, one of the most beautiful of all Spiræas, having pure white flowers in clusters or panicles about an inch in diameter, drooping almost to the ground, astonishingly profuse

in bloom; commonly called bridal wreath.

S. reevesii, similar to S. van houttei, flowers somewhat smaller. S. bumalda, dwarf, has a profusion of rose colored flowers in mid-summer and autumn. S. prunifolia, one of the showiest early flowering species, flowers small and double and pure white. They all may be propagated from hard wood cuttings taken in mid-winter and planted out in spring.

Viburnum (Snowball, Guelder Rose), owing to their large and showy head of sterile flowers, they are much grown in

shrubberies, in groups on lawns, and for cut flowers.

V. opulus sterilis is the most largely cultivated. V. opulus (Highbush Cranberry) flowers in large flat heads in early June. In the fall is full of bright red fruit, making a very handsome bush. They are easily propagated from cuttings. The growing tips should be taken in summer. This should be done during a wet spell, or otherwise the cuttings are very apt to lose their leaves. Insert them in sand on the north side of a building, keep moist and covered with a window sash until rooted.

Syringa or Lilac, as we all know, is one of the very best and hardiest of all flowering shrubs. There should be one or two on everyone's place.

WASH FOR TREES.—I have continued my search for a wash for trees, one that will give protection against borers in summer, and the mice and rabbits in winter, but as yet with indifferent success. You will note that I have dropped the word white in the compound word white-wash as formerly used by me. Really I am in somewhat the same frame of mind as was the old maid who went into the quiet woods to pray for a husband. Just at the critical point in her earnest petition, a big owl perched overhead in deep sepulchral tones vociforated, "Whoo, Whoo!" "Anybody, Lord," she eagerly-replied. have always been looking for a wash which in color was white or nearly so, but at present I am willing to eschew the color question entirely, provided the article is effective.

I am now experimenting along new lines. I have treated a few trees, apple, pear, plum and cherry, with some new compounds which I have hope will not only be sufficiently repellant, but also cheap and enduring as well. My greatest fears are that the remedy may kill the trees. But I shall wait and see. In the meantime I am trying the receipt for a wash given us last year at our annual meeting, by friend F. O. Harrington. Mr. Harrington told me in private conversation that the soap entering into the mixture should first be dissolved in the water with which the lime is soaked, remarking in an easy nonchalant manner that it would foam some. Foam some! have all heard of Vesuvius in Italy, where eruption overwhelmed and destroyed Pompeii and Herculaneum, and of Stromboli in Cicily, and of Hecla in Iceland, and of Kilanea in Hawaii. Now just imagine that all these giant volcanoes in mighty action were combined in one, and you will have some idea of how it looked in the vicinity of that barrel a few minutes after I had poured the boiling hot soapsuds on the lime. When it was safe to approach the rim of the crater and look into its seething, boiling mass I added to what was left a number of other delectable ingredients, and I have applied the mixture to about Wm. Laugham. 500 young fruit trees.

WHY ADAM ATE THE APPLE.

'Tis said that Eve was fair and sweet, Her cheeks were like red roses When she induced her spouse to eat The fruit proscribed by Moses.

Her voice was like a thrush's song, Her smile was most bewitching, Her easy grace the whole day long Kept Adam's heart a-twitching.

Her temper was a model one— Was ever such another?— She never sulked or longed to run And tell her biased mother.

Would you have said, "No, thank you, dear,"
If such a charming woman
Had offer'd you some tempting cheer—
Some lurement of good omen?

Her gentle art first found the way Where knowledge dallied, sleeping; She was the first, so women say, To practice light housekeeping.

Don't censure Adam, he show'd sense In bending to Eve's wishes, He saved his young bride some expense Of labor washing dishes.

Eugene Secor.

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APRIL 1908

IOWA HORTICULTURE

MONTHLY BULLETIN

OF

PLANT LIFE

PUBLISHED BY THE
STATE HORTICULTURAL SOCIETY
DES MOINES, IOWA

IOWA HORTICULTURE

ISSUED MONTHLY

Subscription price \$1.00 per annum, which includes membership in the State Horticultural Society for the year. Subscribers to IOWA HORTICULTURE will also receive the Annual Report of the State Horticultural Society.

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IOWA HORTICULTURE

VOL. I

APRIL, 1908

NO. 4

SPRAYING FAILURES.

F. O. HARRINGTON, WILLIAMSBURG.

It is remarked frequently that people are quite ready to explain and emphasize their successes, but their failures are very quietly held from the public ear, and this only points out a very natural and perhaps a very justifiable attribute of the human character, but notwithstanding this, a study of the causes leading to the lack of the highest measure of success should always lead to a better understanding of the conditions and the ability to more successfully cope with them in future. The word failure may be defined, to miss of attaining, or to come short of reaching a certain standard, which we, ourselves, may have set as the proper or desirable one to attain. To reach absolute perfection in any vocation in life, or in life itself considered physically. mentally or spiritually, is deemed either very difficult or impossible, yet this does not, nor should it, deter us from placing our standards high. So it has seemed to me that a study of causes and effects in the line of spraying of fruit trees for the season, might result in good by stirring up interest in the question, and a general discussion would be of interest to many, because there are few fruit growers now who do not realize its primal and absolute necessity. It is useless for me to enter into an elaborate statement of weather condition during the spring months in Central Iowa, and from thence far southward. You are largely conservant with those conditions, and their effects on the fruit question in the upper Mississippi valley, but I want to say that in my orchard the legitimate effects of cold weather did not cover nearly all the responsibility for loss to the apple crop, save as indirectly it might be a primal, or initial movement in that di-The nightly freezing and daily thawing of the applebuds and blossoms caused an exceedingly slow development, thus causing the blooming period to be strung out very indefinitely, one blossom in a cluster at a time, and there seemed no period at which the spraying ought to be commenced, for one's belief in the possibilities of an apple blossom, or the embryo fruits. passing unscathed such severe conditions would certainly seem to be groundless. If this were true, then the only hope of fruit

lay in the possibilities of the later blossoms and spraying might largely dissipate such a result, for a soaking of anthers and stigma with the strong Bordeaux would be little aid to pollinization.

The most of those present here are aware that apple blooms come in bunches of from five to seven blossoms usually, and you are also aware that with most varieties, but one apple is the final result, though there are some exceptions with all varieties, and with a few varieties it is quite common to have two, three, or more upon a cluster, but these are usually kinds that produce only small apples. The first blossoms in a clump will naturally be the first to close their calix. Quite as naturally their stems grow strong first, take an undue portion of the sap, and finally entirely monopolize it all, to the loss and destruction of the rest. It is, then, these first blossoms whose calix must be coated with poison if we would keep our apples from being wormy. Is it not then clearly apparent that the spraying of the entire orchard should be accomplished in time to catch these embryo apples before the closing of the calix. After that period some good will be done it is true, by spraying, but the result is the difference between success and partial failure. Now with all this in view you will understand that with the conditions that existed last spring that a partial failure was the inevitable result of a late commencement, and especially so, as when we did get to spraying, it rained so frequently that our work was greatly interfered with, and the beneficial results greatly minimized.

I have done much better spraying this year than heretofore, but because of the reason I have given, with less success. Now with a fair proportion of the early broad of codling moth, I was in the direct line of succession for the second brood, which duly materialized, and here let me digress from my subject of spraying to state that I have always so many lines of interest to look after, both personal and otherwise, that something suffers loss. It is said that a blacksmith with too many irons in the fire is liable to have some of them burn, which may measurably explain why, when the spraying should have commenced for the second broad of the codling worm, I was very busy with other matters, so much so that I failed to spend time enough in the orchard to ascertain when they were hatching. I argued in my own mind that because of the abnormally low temperatures, causing everything to be about ten days to two weeks behind usual development, that the codling worm also would be a little behind time, but I acknowledge freely that I misjudged him, for he was on time to the dot. I did not commence to spray until the fourth of August, which later, proved to be at least ten days too late, to which my apples, many of them, bear mute testimony, and here comes in failure No. 2. I judge that this spraying killed nine-tenths of this second brood of the codling worm, but so late that the fruits showed plainly the blemishes, but paring with the knife removes the most of these blemishes, unless a slight browning of the flesh is still apparent, needing a very slight application of the point of the knife to entirely remove. Had this application of spray been applied ten days sooner, it is my belief that it would not only have prevented the blemishes I have referred to, but would also have been effective in the destruction of a greater number of the pests, so that in spite of the earlier failure, the final results would have been fairly satisfactory.

The "Orchard Notes" from Evergreen Farm must this year acknowledge a forcible object lesson, clearly illustrated, showing the absolute importance of spraying in time, allowing nothing whatever save rainfall to intervene, and this not only for the spray after the bloom, but also for the second brood. Of course the last named spray would not be so important, had the first been more successful. While it does not come under the title of spraying failures, yet it is quite pertinent to the subject to state something regarding solutions, and methods of applica-The solutions used for all the earlier spraying (of the apple) was bordeaux 4-5-50 solution with arsenate of soda for the poison content, the formula being 1 pound arsenic, 4 pounds sal soda and enough water that in the end one gallon of liquid be the result; if one gallon of water be added the resultant solution will be somewhat more than one gallon. Boil fifteen or twenty minutes. Of this clear solution of arsenate of soda, one quart, equal to or containing four ounces of the arsenic, was used to each 50 gallons of spray mixture. I like this better in many respects than any other insecticide I have used. One can always depend on an absolute and perfect mixture, and no time is wasted in stirring or working up. My August spray was with the arsenate alone. Of course all the free acid was neutralized by the addition of two pounds of lime to fifty gallons.

I have found no ill effects yet from its use, but I think it is claimed by some, that there is a little tendency, under some conditions, to produce some leaf injury, by using a little strong or by spraying on too much at a time, and that it is cumulative from continued sprays, and therefore liable finally to cause some damage. If this last claim be true, which I doubt, it therefore follows that it is a bad thing for the worms to have around. Undoubtedly the arsenate of lead is the best all around insecticide, but is liable to the objection of much greater expense than other insecticides, and in my own experience, to the objection that in the half dried condition in which it came to me it was the most tedious and patience trying operation of its kind I ever tried. I have learned incidentally that the high price at which

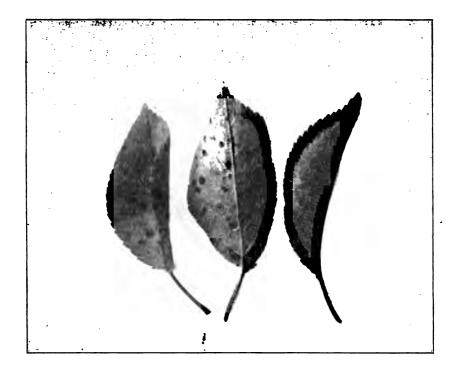
arsenate of lead is sold does not necessarily exist. A young doctor in one of the Amana Society towns informed me that he manufactured all the arsenate of lead used this season in the spraying of the orchards of their individual town, and which showed under severe tests better adhesive qualities than the arsenate of lead from some of the manufactories, that it proved very effective as an insecticide, and that its actual cost, of materials, for a hundred gallons of spray solution was 21 cents, as against 90 cents, cost for the purchased arsenate. He explained that there could not be quite so good a showing under ordinary conditions, but the arsenate of lead used was purchased in large quantities for their large print and dye works, and thus was cheap comparatively. I intend to look into this matter more

fully during the present winter.

In concluding my paper I wish to state that I have used a much superior method of applying spray the past season than ever before, for I purchased and used the "Friend" gasoline spraying outfit at cost of \$275.00. There are several spraying outfits made by different manufacturers in the country, and most of them undoubtedly will do good work, with proper handling, but after a considerable study and correspondence, I selected the "Friend" as more nearly filling all the requirements I had in view than any other, and the season's use of it has been very satisfactory. I had it fitted with three lines of hose, but so far have used but two, and they all the time spraying was done. In all our spraying the engine was throttled down to as slow a speed as it would run satisfactorily, because we did not want or need more power than that applied, and faster running would keep the safety valve running all the time, with greater wear on machinery, and an increased consumption of gasoline. We held a steady pressure in the hose of 150 to 160 pounds. We might easily have run the pressures much higher, but it is not needed, and even a hundred and sixty pounds pressure requires excellent hose to sustain for any very considerable length of time. I have in the past had quite a little trouble with hose under far less pressures. So far our present outfit of hose has not bursted. Heretofore I have used, for many years, the double Vermarel nozzle, but the "Friend" nozzle is greatly superior in my judgment, after a season's use of them. There is one other nozzle manufactured by the Cushman Co., Lincoln, Neb., that is almost a duplicate of the "Friend," and with either of these obtainable. I would not think of going back to any of the older forms of nozzle.

SPOT DISEASE OF THE CHERRY.

THE SPOT DISEASE OF THE CHERRY, (Cylindrosporium padi.)— This disease was quite fully discussed by the writer in Bulletin 13 of the Iowa Agricultural Experiment Station. The



SPOT DISEASE OF THE CHERRY, (Cylondrasporium padi).

disease is easily recognized by the rusty spots appearing upon the leaf of the cherry. On the under surface of the leaf there are little flakes of a whitish substance that clings or holds together. These flakes consist of a large number of spores that are the active agents in spreading the disease. The fungus has three stages. The stage with the perfect spores is produced in the spring in rotting leaves. In these perfect spores the spores are borne in sacs known as asci. The ascospores germinate and cause the infection of the young cherry leaves. When the conditions are favorable infection takes place in a very short time and proceeds from leaf to leaf.—Dr. L. H. Pammel.

A PARASITE OF THE CODLING MOTH.

During a discussion of the work of the experiment stations, at the winter meeting of the Horticultural Society, Mr. Parsons, of Irvington, raised the question as to the success of the experiment with a parasite of the codling moth introduced from Europe by California horticulturists. Prof. S. A. Beach said he would investigate the matter. The following letter from J. W. Jeffrey, commissioner of horticulture of that state, will explain the situation there. This parasite has also been introduced into New Zealand from California, and we hope to hear something of its behavior in that southern country within the year.

Sacramento, Cal., Feb. 21, 1908.

Prof. S. A. Beach,

Department of Horticulture,

Ames, Iowa.

Dear Mr. Beach:—I have your letter of February 15, inquiring about the parasite of the codling moth, introduced a few years ago into California.

The story of the introduction of the codling moth parasite is a long one, and I am afraid is to have an ignominious end, as we have no definite indication of the success of this effort. Our office has bred out thousands of these parasites and we have now a few on hand. These have been located in the most likely places in the state, watched carefully, and given every opportunity to "make good." So far as I know, at the present writing, it has been a complete failure, though, of course, we will keep on with these parasites as long as there is hope of success.

we will keep on with these parasites, as long as there is hope of success.

This parasite of the codling moth, (Calliephialtes messor) was imported from Spain in 1904. The state searcher for beneficial insects in writing of the conditions under which he gathered the parasites stated that he found tons of apples piled up in the orchards to rot, as market conditions did not justify their removal. If these conditions prevail in Spain, or the wormy apples were left on the ground, this would account in part for the success of the parasite in its native place. No such conditions are found in California orchards. Here the apples are all taken to the packing house, there to be assorted and the unfit fruit destroyed or left there to rot. This practice largely removes the moth puppe from their natural conditions, and we believe this is one cause of the failure of this parasite in California. Under breeding house conditions we have not ten in one thousand worms that were not destroyed by the parasite, showing its effectiveness under artificial surroundings. It might be more effective in eastern orchards where summer apples are grown or where different harvesting practices are in effect. This can only be determined by thorough trial.

As you perhaps know, there has been a great deal of exaggeration about the work of this supposedly effective parasite, as well as about the achievement of other insects in California. One out of a hundred of these importations may prove useful, and two or three of them have been positively beneficial,—the Vedalia cardinalis, in fact, proving an overwhelming enemy of the cottony cushion scale. With one success out of a hundred, it is worth while to keep this policy in effect in this office, but we have more hope of using our native parasites than from anything coming in from our insect searcher, who is in the field now

looking for parasites.

I am sorry to have to make this report regarding the codling moth,

but I know you want to know the truth, and at present we are placing no dependence in this insect in the control of the codling moth, but, on the other hand, are continually improving our means of artificial control.

If there is anything further of which you wish to inquire, about parasites or any other subjects relating to horticulture, I shall be pleased to give you a frank answer.

Respectfully yours,

(Signed) J. W. JEFFREY,

State Commissioner of Horticulture.

EDIBLE NUTS AND THEIR SCIENTIFIC VALUE IN CELL-LIFE.

DR. A. B. DENNIS, CEDAR RAPIDS.

We have for many years advocated nut culture in Iowa, and in a small way have put our advice into practice by planting a few trees and seeds, and from a plant breeder's standpoint, have had a small share of success in hardy seedlings.

We have, however, been disappointed in not succeeding in

arousing public interest in nut culture for Iowa.

These nut bearing trees deserve more attention than nurserymen and fruit growers in lowa have so far seen fit to bestow upon them.

I am sure if we propagate and plant them more extensively, they will not alone add to our income in dollars, but enhance

the health and enjoyment of every lover of nut food.

The nut industry is growing in other states at a wonderful pace. Twenty years ago there was not a book or bulletin published in the United States. Today we have the splendid bulletin put out by the Department of Agriculture, many state bulletins, and the fine book on Nut Culture by the late A. S. Fuller, and Prof. Hume of Florida has recently published a fine work on the Pecan and its culture. There are at least three monthly journals devoted to this branch of fruit culture.

There is also a National Nut Growers organization represented by eighteen states, and tens of thousands of acres in the South are being planted into pecans, and many hundred acres of chestnuts in the eastern states; and it pains me to realize that

Iowa has practically done nothing.

I am aware that Iowa land is extremely valuable for farm products, but we have one hundred thousand miles of public roads, and every one of these should be lined on both sides with hickory trees, and the legislature should compel every railroad in the state to line each side of their road beds. These public roads can only be reached in this wealth producing improvement by the state; but the rough lands along our streams that are unfit for farming, should be utilized by the owners in planting

nut trees, also every city and town should plant them along their

streets instead of cottonwood and soft maple.

I think in the south half of the state the chestnut should be added to the hickory. Both these nut bearing trees are beautiful, and their rooted system is not destructive to other crops like the black walnut. This tree should be planted away from crops, for it is a regular glutton, and no crop or tree will thrive and grow near it.

The hickory is the best tree for us to plant all over the state: the quality of the nuts are equal if not superior to the best pecans and will grow in every county in Iowa. There are many bearing now, that each county should select, and propagate and plant as I have stated. It is very difficult to graft the white hickory, but if the red hickory is used as a stock, it can be successfully grafted, and this bitter nut will grow three times as fast as the white hickory, hence will make a very desirable root to grow our best bearing trees.

I really believe if the pecan is worked on this root it will give us a good chance to grow some pecans also, especially in the

southern portion of the state.

Chemists have found that edible nuts are extremely high in food value, and make excellent substitutes for animal meats, as they are rich in fats and all the chemical elements that are especially valuable to the teeth and other parts of the human skeleton, and right here is where this subject becomes more intensely valuable to each one of us, than any commercial value alone could possibly be, for if nut food is one of the factors by which ill health and old age can be avoided or postponed for years, we should welcome nut orchards as well as other fruits and make edible nuts so plentiful that even the poorest can have them as a daily food upon their tables, as the rich today alone can have this health giving luxury.

Our bodies, like our trees, are made up of living cells. These life cells make our bones, our muscles, our brain and nerves, and in health are constantly worn out. It is the work of the blood to carry this dead matter to the secreting organs to be cast off to make room for living cells manufactured out of our food, and the secret of health and perpetual youth is for the blood to keep a perfect balance in this wonderful work of waste and repair of our bodies. This can only be done by proper food and strenuous exercise of the muscles, brain, nerves and bones. The older we become the greater the necessity for activity, for this alone breaks down these cells to make room for the new to build up during sleep and rest, for the skeleton holds all the rest of

the body like the foundation of a building.

If this gives way, as it so often does in accidents that befall us, all the symmetry, beauty of form, and elasticity of step disappears. Man, because of his erect position, and the law of gravitation that constantly pulls him to earth, seems to shorten as the years go by, but there is a scientific cause for this outside of the other two, and that is the wearing away of the small, rubber-like disks or cartilages between the vertebra bones in the spinal column. The thinner these get the shorter we become and the less graceful our bodies move, we then are old and stiff; but this is not the only bad feature.

In our spines are twenty-three of these cartilages that leave small window like openings in each joint. Through these pass thirty-one pairs of nerves that branch from the spinal cord, the thinner the cartilages the smaller the openings for these bundles of nerves to pass through, and radiate to all parts of the body; and if pressed for want of room the result is loss of power, mental and physical, and when one realizes there are fifty miles of nerves in the human body, we begin to see the importance of the necessity for proper food and exercise for the cartilages. And there is no better food than oily nuts and fruits that contain oils, like the olive and avocado, and constant exercise so as to keep up the waste and repair of these elastic cushions in our spines, and give these fifty miles of nerves plenty of room to keep them active and do service wherever the brain directs.

You will note this paper has not been strictly devoted to nut culture. For a number of years, including last year, I gave that subject full scope, and these papers are published in the state reports. I can not see that they have made much impression on the nurserymen, who must first grow the trees before the people can plant nut bearing trees, so I have hit upon this plan of food value in nut fruits, and the wonderful influence they have upon the arteries and cartilages in the human skeleton, and it may be, I shall influence some of these aged nurserymen to renew their youth and grow the trees, and I feel sure if they do, there will be plenty of buyers, and best of all, dedicate themselves to the great work in this reform movement for more healthful and brain refining food for our race, than the hideous cruelty of slaughter-houses now give us.

I beg to submit the following conclusions:

First.—The nut is a valuable article of food, containing in a concentrated form all the essential elements of a proper food.

Second.—The principal objections to the nut as a food product are the alleged difficulty of digesting them, and the tendency to become rancid if kept for any considerable time.

Third.—Owing to the large per cent of oil, in nearly all the varieties, nuts should be well masticated, and partaken of with other food. Under such circumstances they are not only highly nutritious but aid in digestion.

Fourth.—Their digestibility, and hence their nutritious prop-

erties, are enhanced by proper preparation and by combinations with other food, and by cooking.

Fifth.—The usefulness and value of the nut as a food product is becoming more widely known and appreciated by sanitarians, fruit-growers, capitalists, and connoisseurs in the art of cooking, and the belief is expressed that in the near future the demand for this fruit will be such as to greatly encourage its cultivation.—Dr. F. J. Kennedy.

THE HOME GARDEN AND TRUCKING FOR MARKET.

H. G. BALDWIN, NORTHFIELD, MINN.

For several years in my home state of Minnesota, I have been a strong advocate in favor of giving more time and attention to the vegetable garden, at our annual meeting. A horticulturist is a person who works in a garden, so the vegetable has as much right to a place on our program as the apple, plum or berry. I have no statistics to show, but believe that the vegetable products far outstrip our fruit output in values every year. I would not have any of you a bit less interested in the fruits and berries, for they do need careful attention. The man who is too nice to put on his old clothes and handle the manure of the soil, better not undertake to do gardening. It is said of Peter Henderson that a fine dressed gentleman came on his grounds one day and seeing a man turning over a compost pile, asked him if he could tell him where Peter Henderson was. The reply came quick: "I am Peter Henderson," and by the way what a whole-souled. unselfish man he was. He helped many a man to his feet by his kindly advice.

One of the first things a successful gardener ought to understand is how to run hot-beds or a vegetable house. There are so many plants that must be started early and transplanted out, and these are the kinds that bring in the best profits. Use as much good sense as the housewife does in setting up her bread and you will make a go of it.

In these days of cement, I have found a very convenient and durable bed or pit can be made by digging a trench six or eight inches wide and from two to two and a half feet deep and any desired length (mine are 24x6 feet, inside measure 5 feet, 9 inches). Set up boards on surface by the trench so that a true facing can be made, making the upper or north side the highest to give slope to the glass. Fill in the trench with cement; 5 to 1 will do below the surface and 3 to 1 for top of facing. Work in all the old brick, stones, old iron, scrap wire and the like, which will keep the walls from cracking. After a few days

you can dig out the inside, filling up around the outside even with the facing. This also makes a very convenient place to store late cabbage, celery, parsnips and the like.

The board shutters needed for extra covering in the spring can be used to keep off rains and cold, and covering can be added as needed. I usually keep my loam in one end of the pit where it does not freeze, being covered with leaves or litter. I have spoken somewhat in detail about this cement pit, for I am sure it will interest some of you, and it is so practical.

During the cold weather is the time to look up the seeds needed. It is a great study to get the best. If one plans just for his own use, it is different than when you plan for market, for one must not consult his own taste so much as the taste of those who buy. Life is too short for one to try to educate other people's tastes to be like your own.

I always avoid the seedsman who has the "biggest things on earth." The state experiment station ought to give the best of

information about kinds adapted for your locality.

Then, too, a careful study ought to be made of each special kind to know how much room to allow the plants, the kind and amount of fertilizers. For example, the Earliana tomato ought to be given high culture with manures, while many other kinds would grow too much tops with the same culture.

Where one calculates to do general garden work, raising all kinds of vegetables, a variety of soil is very desirable. A sandy loam for melons and squash is best, also for many of the small vegetables, while the deep black damp soil is needed for celery.

Time would not allow to go through the whole list of vegetables, but I would like to speak of the culture of a few. I succeeded in raising some fine muskmelons this season, and we all know how hard the season has been to get any at all. I find it quite easy to raise the plants in the oblong berry box set close together and filled with soil in the hot bed after a crop of lettuce or radish has been gathered. Plant about six seeds to a box and let grow about four weeks. One can transplant from these boxes, without the plants wilting, but be sure the ground is warm and all danger of frosts over.

The Osage being a bit late, works fine with a month's start; also the Gem and Tip-Top, or White Japan. Rocky-Ford is too apt to rot owing to its rough skin that catches the disease spores. A good melon always sells well in almost any town.

Now just a few words about the Hubbard squash. I believe the best way is to open up a deep furrow, fill about half full of rotten manure and plow back over it a ridge, drag down and plant seeds on top. I have secured a fine crop in a bad season in this way. If squash are rather soft when the first frost comes, they will be greatly helped by putting on them just a handful of straw or any convenient covering, old cabbage leaves or what is most handy, to take the frost. In this way they can be left on the vine some days longer and will become quite hard and

then, too, will keep much longer.

My remedy for the bugs, I admit is a novel one. I have for several years killed off great quantities of them with a gasoline torch such as the painters use. Seeing they cannot be poisoned like most other bugs, one has to resort to other methods. I keep a watch and as the swarm first comes forth, I can often get several hundred in a single hill. Have a small pan to put over the hill, and as they come out on the edge a touch with the blaze kills them, the plants receiving no injury. The big black stink bug I found I could exterminate very quickly in this way. I have killed squash bugs in this way, until the ground around the plants is covered with dead bugs, and still had a good stand

of plants.

The tomato fills the place of fruit in so many places, that it ought to have a position along side of the apple, although it may have to take a lower shelf. A party near my home raised 200 bushels of apples and yet he came and bought three bushels of tomatoes from me. What marvelous strides the tomato has made in the past few years, and how everybody uses them. The usual gardener can have them on his table every day from the Fourth of July to the first of November, four months. The Earliana and Chalk's Jewell have been standard with us for several years, but I was highly pleased with Jack Rose and especially the June Pink or Pink Earliana this year. Stone and Livingston's, however, are fine for real late varieties. Burpee's Pink is good quality, but too many are rough. Ponderosa is fine for private use. It ought to be staked up for best results. By transplanting the earlies three times, one can get strong plants that need no shading, and when setting in the open ground set slanting in a shallow furrow, so if a frosty night should come, just pull away the dirt on the slanting side of plant and drop below surface, and cover with dirt. Several hundred plants can be covered in an hour in this way, and a few moments in the morning will uncover them. A few plants set in the hot bed after the other crops are off will bring on the first fruits.

If ground is light, a manure mulch is good to keep moisture and add fertility. The tomato is one of the best paying crops to the extent there is a market. It is quite possible to raise a

bushel to the plant.

Let's talk about the potato a little. Who is there here that does not want them on the table at least twice a day, if not three times. In our locality the Ohio for early and the Rural for late are standards. Did you ever think how different these two kinds need to be raised? The Ohio will grow in ten or

eleven weeks, while the Rural needs eighteen to mature well. Now it stands to reason that a potato that will grow in so short a time must have extra nourishment, so we find it necessary to manure freely for them. Cow manure will make them scabby much worse than horse manure. The seed ought always to be soaked in corrosive sublimate one and one-half hours. The Rural will grow coarse and hollow on too rich land and manure has a tendency to make them rot too. There is no question in my mind but what all ought to spray their potatoes with Bordeaux mixture and keep the tops healthy for the rot usually comes from a diseased top. This year on my crop of a few hundred bushels, I sprayed with arsenate of lead and Bordeaux. I find the lead sticks to the foliage, and no danger of burning, however strong it is put on, and kills the bugs too. While others lost heavily with rot, I did not lose over one or two bushels in all. I did not use a bit of Paris green this year. The lead worked fine on apples too.

The public will buy good peas of the gardener, as long as he can raise them. Raise only the best and never fool the people with old stock. The most successful kinds with me are Surprise for early, Nott's Excelsior to follow, and for late, Carter's Daisy. The seed of the last came from England and they did remarkably well; big pods, high quality and quickly picked, dwarf growing.

The old bush cranberry bean pleases the customers always, a great cropper. Celery culture has always interested me, having often had it on hand for market six months in the year. As I have all upland soil, I have grown from five to ten thousand a year. Irrigation is usually necessary for the early White Plume or Snow White, but the late varieties generally come out well with the fall rains.

If time would allow, I should like to take up the subject of winter storage, economy of labor, marketing, diseases of plants, There is a neat little sum to be made from the onion crop if properly handled, and I contend that gardeners ought to raise their own seed and sets rather than be paying out so much to seedsmen. It is very easy to grow sets from seed and the Silverskin is one of the best for this purpose. One needs to make up some shallow crates to keep in and it is a lot better to have a few by to sell than to pay out from two to three dollars a threepeck bushel for them. Grow on the poorest soil you have, and sow seed at the rate of thirty-five to fifty pounds per acre. The regular field crop of onions should be gathered in crates without topping as soon as ripe and dry enough. A convenient size is a slatted crate made with four posts or corners one inch square. and projecting one and a half inches below the bottom part, so that as ranked up this air space comes between each crate. The

crates hold about one and a quarter bushels, or a bushel of clean onions when topped for market. In this way one can readily

keep them all winter in most any cool, dry cellar.

So many make a failure of gardening because they do not know how to combat harmful insects and diseases of plants. Our state experiment station has been doing much along these lines. Prof. Washburn and others have been working hard to exterminate the radish and cauliflower maggot that does so much damage. We are developing as many parasites as possible that pray on their eggs. About half of their eggs are being destroyed by the parasites. The cabbage worm is not so hard to combat against in these days of knapsack sprayers and insecticides. A solution of soap suds and lime water with a small amount of arsenate of lead sprayed on the young plants in the middle of the day does quick work, and if sensibly applied is not in the least dangerous.

As I see things in our state, there are fine openings for men of limited means to go into gardening and berry growing, men that are willing to toil and adapt themselves to the work. Then, too, there is the satisfaction of knowing that you are a producer in the world and that you are producing things people want. Our tables are being bountifully supplied with breads and meats by the farmers, but we need the celery, lettuce, berries, and other vegetables that come from the home and market gardens.

THE FARMER'S FLOWER GARDEN.

J. S. BENNETT, STORM LAKE.

The farmer is a man of progress. He has the latest machinery. In a few decades he has advanced from the use of the hand cradle and the flail to the self-binder and steam thresher that will do as much work in a few days as would a score of men in a season after the old method. He has advanced to the rural telephone which puts him in instant communication with the busy world at large, and the electric road that puts his products on the early market at par with the city dealer or stops at his door to take him to the centers of population. I might cite many more marks of progress, but I have been warned to be brief.

Along with this progress should we not expect him to transplant the flower garden from the city park to his country seat? The main planting of every home ground should be largely of trees and shrubs. The home maker should have a picture that he endeavors to produce, and to brighten it, he should plant flowers. The kind of flowers to plant is not so important as how and where to plant them. A flower that is otherwise insignificant is made attractive when placed against a background of trees or

buildings. The flower beds in front of houses usually lose their effect because of this reason. Small beds is a stingy method of growing flowers. When Nature plants a flower bed, she plants enough of them. A man may be impressed with the beauty of a geranium bed in a city park, while the few sickly geraniums in his own flower bed makes no impression upon him. Plant enough flowers so that you can pick a large bouquet without marring the beauty of the garden. Seeds are cheap. Do not buy novelties; leave them for some one else to prove. As a usual thing, packets of mixed colors are the best, especially of such flowers as sweet peas, nasturtiums, petunias and asters.

Even if you live on a rented farm, you can have flowers. Many of the most showy flowers are annuals and the expense for seed is not great. Prepare your soil well, and if necessary, spade in some well rotted litter early in the spring. If borders are made in sod, have them at least three feet wide that the grass roots may not run under them, and so rob them of their support. Run a sharp spade around the bed from time to time to cut off

the grass roots.

Sow sweet peas early in the spring. It will not injure them if the ground freezes after sowing. Most of the annuals should

not be sown until corn planting time.

Having your bed thoroughly prepared, press the ground level with a board, and sow your seed thickly and afterwards thin out the plants to the required distance. If they are to be viewed from all sides, place the tall ones in the center, or if against a background, place the low ones in front. Keep the ground loose by cultivation.

Some of the best screens are made of annual vines. Morning-

glory, cobæa, and madeira are useful for this.

Plants with bulbs can be grown by the renter very well. They can be kept over winter in a celler, in a place that is suitable for potatoes or onions. They may be started early in the spring, and so get an early start. Gladioli, dahlias and cannas are suitable bulbs for this treatment.

The one who owns his own farm can have many more flowers among the hardy shrubs that will not require much labor and be a more permanent part of the garden. The home flower garden is for the enjoyment of the family rather than the passer-by, and affords an opportunity for experiment and study. It should display a large amount of individual taste. You may ask your florist's advice about your garden and then after studying what the market and material at hand offers, you can develop your own thoughts and get more pleasure from it than by following fixed rules.

The Editor's Page.

A summary of the reports for April on the condition of fruit trees and plants shows the following per centage: Apples, 93 per cent; pears, 90 per cent; plums, 93 per cent; cherries, 90 per cent; peaches, 76 per cent; raspberries, 77 per cent; blackberries, 85 per cent, and strawberries, 90 per cent. This is a high average, and with normal weather conditions, the prospect is encouraging for a crop of fruit this year.

. . .

Raspberry canes show considerable injury from anthracnose. This disease appears to be increasing and more heroic methods should be adopted to hold it in check. It was recommended by some growers at the winter meeting last year of the Southwestern Society, to cut off all the canes in infected patches and to burn them. This was said to be more effective than spraying. That the yield of marketable fruit every other year would be as much as when the patch was allowed to fruit every year, when the canes are badly injured by the disease. The best remedy, for the home garden, is to cut off all diseased canes and burn them; it is better than spraying.

Arbor Day was the outgrowth of the arid conditions in the west, where tree growth almost disappears; it was the reverence for and longing after the trees of boyhood days that was the inspiration which gave it birth.

To the city denizen the street tree becomes an object of intense interest when the planting fever comes on, and he has a The sugar maple, a queen among deciduous bad attack of it. trees, an ornament to any lawn or street, is well suited for planting in the smaller towns, but in the smoke of larger cities, where its roots are confined beneath brick pavements, it does not thrive so well; like the oaks, it does not take kindly to the familiarity of men and the trampling of many feet about its roots. The Norway maple under such conditions thrives better. The ash-leaved maple that was planted extensively in the Northwest has lost some of its prestige on account of the box-elder bug, which has become so numerous in places that they cover the sidewalks. and frequently in warm days in autumn they gather in large numbers on the sides of houses until the people have declared war on the bugs and trees.

I have a great deal of admiration for the American plane-

tree, or button wood. Its strong, ascending trunk, with mottled bark and wide spreading branches with pendant, tassel-like buttons, makes it a picturesque object on the street. It does not grow as large in this state as farther south and east.

The rock elm does better on poor soil than the white elm. The American elm needs no words of commendation, for when grown on rich soil it is a tree of great beauty; but it must have

room for development to see it at its best.

We should not forget to plant freely of our best nut trees. Nuts are an excellent substitute for meat in the daily ration. It is a concentrated food and one does not need to eat a great quantity of nuts to get the same amount of heat as from a less oily substance. If more nuts were grown and eaten by our people, there would be less demand for meat.

MELONS AND SWEET POTATOES.

J. E. HOOPES, MUSCATINE.

Melons are annuals which grow wild in the warmer regions of Asia and Africa, but are cultivated in temperate regions all over the world.

There are two general classes, the watermelons and nutmegs. In selecting melons for cultivation we find that there are two things to be considered, first the quality and then to get a melon that will stand transportation well. It is found that the watermelons having the best flavor and finest grain have thin rinds so will not endure shipment.

At present in our vicinity the Black Diamond, Triumph and Kolb Gem are the leading shipping varieties, while the Sweet Heart and Long Icing are those preferred for the home market. The leading nutmegs grown on Muscatine island now are the Osage, Hackensack, Irondequoit and Rocky Ford. In preparing our ground for melons we usually furrow out as deep as possible with a large single shovel plow or lister.

The rows for watermelons are ten to twelve feet apart and nutmegs seven feet. Well rotted manure is much the best and put it down deep under the hills or rows. Watermelons in hills about eight feet apart while nutmegs are drilled in the row. A strip of rye grown between the rows is very beneficial to protect the vines when small from heavy winds and drifting sand. After the plants are good size and past all danger of bugs, thin watermelons to one or two plants in a hill and nutmegs to one plant every three feet in the row.

Keep the crop well cultivated, and you will usually be rewarded with a good supply of luscious fruit.

Sweet potatoes are so generally grown and their history

reaches back so far, it is hard to tell just where they originated. There are many varieties in cultivation now, but the yellow ones are grown for the main crop, such as Yellow Jersey and Yellow Nansemond. Some of the other kinds, including the Red Jersey, Red Nansemond, Red Bermuda, Early Golden, Southern Queen and Gold Coin Vineless should only be grown to satisfy a person's curiosity. To grow a crop one must begin with the hot-bed to secure the plants. Locate it in a place well protected from northern winds and having southern exposure to the sun. The time of making depends on the season but ordinarily the first week in April is the best for this locality. Dig a pit twelve inches deep and the size of the bed desired.

It requires about twenty square feet of bed for one bushel of ordinary sized seed potatoes. Fill the pit with well prepared fermenting horse manure, tramp and level with a board, after which cover with three inches of good sandy soil. Erect your frame with sufficient slant so that the covering will shed rain. As soon as the bed warms up nicely lay your potatoes and cover with two and one-half inches of sand.

The care of the bed is very important. Do not let it get too dry, too cold or too hot, as some of the diseases which spoil the crop originate in poorly kept beds. About the time the sprouts are cracking the surface of the ground a thorough raking is very beneficial. When the plants are three inches high and well hardened they are ready for planting out in the field. In selecting a field, choose your best sandy soil with a subsoil that will retain moisture. Spread your manure either broadcast or in rows as desired. The setting of the plants is accomplished either by hand or machine, machine planting being preferred, as it firms the ground much better around the plants. Therows should be about three feet, eight inches apart, and set the plants fifteen to eighteen inches apart in the row.

Ridge and level culture are both practiced in our vicinity at present. The level culture has some advantages over the ridges. It places the plants where they retain the moisture better and the cultivation is largely reduced, as it is much easier to work to the plants with the plow, thus curtailing the use of the hoe. The best tool to cultivate with is one that works both sides of the same row at once. The ordinary eagle-claw plow is used very extensively with us. When the plants vine use the vine turner attachment, cultivate every eight or ten days till the middle of July or the first of August. If the weather is at all favorable, you ought to have potatoes large enough for table use by the middle of August or first of September.



SIBERIAN ALMOND.

One of the early harbingers of spring is the Siberian almond. Its snowy white blossoms, which are borne in great profusion, appear as one of the first blossoms of spring.

The plant is quite dwarf, commonly less than four feet in height. Its hardiness for this section is evidenced by the fact that the blossoms to the very tips of the branches open out in perfect condition, as will be noted by the accompanying photo. This plant is much superior as an ornamental to the common flowering almond sold in most nurseries and deserves wider attention on the part of both the propagator and public.—A. T. Erwin.

CARE OF THE FARM ORCHARD.

ARLINGTON LEWIS, CASTANA.

In the growing of fruit, there is nothing of more importance than good rich soil. It is true that climate has a great influence, and success cannot be attained without its help. Yet the quality of soil is of greater importance than we sometimes think. Given a soil with all the necessary elements, and fruit raising is comparatively easy, but given a soil lacking the proper elements and only an expert can succeed, and that by supplying the needed parts.

A loose, well drained soil seems ideal. The water level is, in my judgment, of great importance. How much influence it may have upon the orchard I do not know, but am convinced that the strawberry plant enjoys having a water level less than twenty feet. In fact, six to ten feet would be about the right depth.

There is more difference of soil in just a few miles, or perhaps a few rods, than one imagines, so I believe that on the farm there is a wide choice of soil. Choose the well drained, rich soil for your orchard site. I do not believe in taking the poorest piece of land you can find for your orchard.

I have noticed that when orchards are set on poor hillsides and barren points, the trees do not grow rapidly enough to resist fungous diseases, which of late years have become so prevalent. And thus they come up to the bearing age, crippled and unable to produce a healthy crop of fruit. To be a productive and profitable tree it must be thrifty and full of vigor.

Poor soil and poor care leaves the tree in just the reverse of this condition, and it is only able to live, say nothing about producing fruit. If your trees are already on poor land, fertilize them, and that, too, plentifully. A few inches of well rotted manure spread evenly under the tree as far at least as the limbs extend, will be a great help, and upon almost any land a tree in full bearing should be fertilized.

Fertilizing, I think, is of more importance than tilling. Only, by all means keep out the bluegrass or any kind of grass that sods. Bluegrass I find to be one of the worst enemies to all fruit plantations, especially bad around the strawberry patch, and am planning destruction to all bluegrass along the roadside, and am intending to replace it with alfalfa.

Pruning of the farm orchard is a knotty problem to the beginner, in fact the older heads are bothered. I will pass this subject lightly. Avoid cutting large limbs, let your pruning consist of removing small twigs and branches that leave few scars, remove dead limbs and diseased parts. Some recommend that when a cavity is formed in a tree trunk, we should clean it out thoroughly, wash with Bordeaux mixture, then fill with cement.

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We cannot prune our trees as much here in northwestern Iowa as they do in some parts of the United States. A great number of trees have suffered from poor pruning, in fact I think the ordinary person does more harm than good.

Spraying.—As to the spraying of the farm orchard, there is no question but what it will pay, and the more thorough you are, the better the results. The expense is light. Perhaps the cost of material will amount to ten or fifteen cents per tree for four sprayings. This should not mean more than one or two cents per bushel on your apples, and salableness will likely amount to twenty-five or fifty cents per bushel and perhaps more, as the yield of sound apples is greatly increased by proper spraying.

No one can do a good job of spraying without a good pump, and here is where "well begun is half done." A good pump means one that agitates, that doesn't clog, and has power enough to make a fine spray and force enough to reach the topmost branches. A pump that will last a lifetime, and will be satisfactory for all kinds of farm spraying, can be had for about \$20.00.

If you intend using a small, cheap pump, I am certain you will not like spraying, as it will take so much time and labor. You will be disgusted and quit before you get hardly started. So by all means, no matter how small the orchard, get a good pump and material ready prepared.

Not everyone who farms has a good family orchard. Many think it takes too long to bring trees to a bearing age to pay, but time flies and apple trees are not so slow as they seem. I think we enjoy the small orchard on our place as much as anything we have in the fruit line.

Varieties.—I am unable to name the best varieties for this district, but there are a few I would recommend. Wealthy for summer is, as you all know, a fine apple; it may be kept all through the fall by storing it in a cold place. The Snow is a great apple for the family orchard, as it is one of the very best for preserving and canning, and for eating it is fine. We still have Snows to eat, and they receive our first attention. Then comes the Sheriff or American Beauty, which we prize very highly, and I do not know of any variety that will outyield it one year with another, as it never fails, at least with us.

Now, as to what other varieties are best for the farm orchard, I will leave to you. I highly recommend these three friends of mine, add to the list as you like.

ROSES.

G. B. HEALY, STOUX CITY.

It is not generally known how easy it is to grow these beautiful flowers. I now have seventy-five varieties; and of the hardy

roses there are twenty varieties. I will name them; all hardy, hybrid perpetuals:

Mrs. Robert Peary:

This is said to be the one white hardy climbing rose. I have one growing, but those I have planted before I have lost in the winter. I have not, however, given it a fair trial. It is simply an elegant rose, well worth trying. Dr. Miller, of the city, has grown them successfully.

Prairie Queen:

An old reliable rose that every one knows of.

Crimson Rambler:

Very hardy, and one which you are familiar with. There are other ramblers, yellow, white, etc. I have never found them successful in blossoming.

Climbing Wooton:

This rose is recommended very highly. It is a little hard to get started, but after the first year grows very strong, and has a very beautiful pink blossom. I have a very fine plant.

Empress of China:

Climbing rose. Grows very rapidly. Not very hardy. Needs a great deal of care in the winter time.

Baltimore Belle:

A climbing rose of blush color. Said to be not hardy in this latitude. I have a beautiful plant, however, that has been growing five or six years, blossoms very freely and is a grand plant. I think it is worth while to try it.

These are all the climbing roses I have had success with.

American Beauty.

Anna Diesbach:

Splendid carmine rose. Hardy and beautiful.

Coquette des Alps:

A lovely white rose with a little blush center. It is very hardy and a very free and strong grower, and blossoms all the season freely. It is simply a *splendid rose*.

John Hopper:

Rosy pink, very large and full. One of the *very best* roses. Grows strong stout stems and blossoms profusely.

Dinsmore:

Crimson scarlet. Hardy. Very large double blossoms. Needs to be *thinned* as to buds. It buds so fully that frequently they do not have strength to blossom out.

·General Jacqueminot:

One of the very best of them all, but you know about it.

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La Reine:

Pretty pink rose. A very graceful, pretty rose tree and lovely blossoms. It is a hardy reliable rose. You ought to have some of them.

Madame Plantier:

Pretty white. Exceedingly hardy. Blossoms very freely.

Magna Charta:

A splendid rose. Rosy red with large blossoms.

Margaret Dickson:

A pretty white rose, very highly recommended. I have one, but have not had it sufficiently long to say how hardy or valuable the rose may be.

Paul Neyron:

Has the largest blossoms of any rose known. It is all right in every respect.

Mrs. John Lang:

Pretty shaded pink. A lovely rose, very hardy, one of the old reliables.

Prince Camille de Rohan:

It is known as the "black rose." It is a red, velvety crimson, shaded black. I have only one bush and it is not growing strong, but it has been with me five or six years and I think it all right.

Ulrich Bruner:

Very like the Jack rose. A very hardy, strong grower, I think the very finest rose in my garden. No thorns!

Victor Verdier:

Rosy crimson. A good, reliable, hardy rose, and a beautiful blossom.

Peony:

A profuse bloomer. The buds need to be thinned somewhat. It is hardy. The roses individually are not so pretty as some; but the effect of the rose tree in full bloom is fine.

Marshall P. Wilder:

Crimson shaded with maroon. Very large and double and certainly a magnificent rose.

I have planted very few other than hardy hybrid perpetual roses. One rose, a hybrid tea, called Belle Siebrecht, is a deep pink and a beautiful rose. I think it is the most beautiful rose I ever saw. It is said to be hardy with good protection. I have never been able to keep it over winter, however. Perhaps you can do better than I. This rose has long pointed buds that are simply beauties. A pink LaFrance is another rose of like kind.

AN EXPERIMENT WITH NATIVE IOWA FLORA IN THE HOME GARDEN.

MISS HARRIETTE S. KELLOGG, AMES.

At no time does the voice of Nature speak to us more clearly than when we wander amid "God's first temples," the groves. With the waving foliage above and the carpet of ferns and mosses and delicate hued floral beauties beneath, we seem very near to the heart of creation. But our avocations call many of us far away from these more natural surroundings, and, amid the more artificial life of the town, we are prone to forget the splendor of wood and field. Yet it is possible to bring a bit of woodland glory to our very doors and thus keep our souls attuned to the harmony and beneficence of the deeper teachings of Nature. Although we may not often enjoy the delicate blooms in their native setting, we may train them to flower for us in the more prosaic town garden.

In the present article, the writer has in mind merely to record one such attempt made by a lover of woodland flora to transplant favorite species to the home garden, and, while discussing her experience covering a period of thirty years, it may be interesting to note certain results of ecological importance produced by the adaptation of the different plants to their new environment.

The ground to which the native plants were removed was devoid of shrubbery save for a few fruit trees along the eastern side. It had a southern exposure with sufficient slope to insure drainage, while the trees afforded a shade nearly as dense as that in the woods from which the majority of the transplanted speciments were obtained. In the southeast corner a small boulder offered an inviting place for ferns and mosses.

In removing plants from the neighboring groves, especial care was taken to also remove with them an ample amount of soil in order that the demands upon the plants' recuperative powers might be taxed as lightly as possible. This care in bringing large clumps of earth more than repaid the gardener for her trouble since by this means other seeds and roots were unwittingly brought to the little garden and in due time surprised the worker with their unexpected appearance.

The first plant experimented with was the liverleaf (Hepatica triloba).

Which puts forth her sister blooms of faintest blue,

and although the first root was brought to the garden more than thirty years ago, not a season has since passed that the dainty blue and pink stars have not been found blooming cheerily beneath their covering of leaves, while the earth is yet shrouded in its somber winter mantle.

Lungwort (Mertensia virginica) blue phlox (P. divaricata), and Greek valerian (Polemonium reptans) were the next inhabitants of the plat, and have proved the most adaptable of all the varieties transplanted. They have bloomed and multiplied until in the spring time the corner is a mass of blue. Anemones, the

Windflowers which sway Against the throbbing heart of May,

meadow rues (Thalictrum dioicum), blood roots (Sanguinaria canadensis), whose sanguinary names belie their snowy blossoms, and spring beauties (Claytonia virginica) have merely held their own; that is to say they blossom each year without fail, but do not increase in number, new generations of plants not more than supplying the places of those disappearing. The buttercup (Ranunculus septentrionalis) and yellow violet (V. pubescens),

Whose modest bell Peeps from the last year's leaves below.

furnish a touch of gold to the color scheme of the garden.

The blue violet (V. palmata cucullata) has become thoroughly established in its new home and often rewards the gardener with a second crop of blossoms, several flowers having been picked this year as late as November 16, rivaling the English sweet violet in color and fragrance.

In another part of the yard, at the roots of an old lilac bush, where there was an abundance of moisture, ferns and kindred plants were set out and at least six species have been successfully transplanted. Maiden hair (Adiantum pedatum), the dainty woodsia obtusa, polypodiums from North Carolina as well as from Iowa, cystopteris, the walking fern (Camptosorus rhyzophyllis) and one species of asplenium have thriven well and vie with the imported greenhouse varieties in beauty. Near these, a botrychium has also become established.

While making the garden it has been a pleasure, oft repeated, to find unexpected plants which have been inadvertently brought as seeds or as roots with other plants. Among these were Jack-in-the-pulpit (Arisaema triphyllum), whose purple stains the old legend tells us were drops of blood caught in the cup as they fell from the Savior's body at the Crucifixion, true and false Solomon's seal (Polygonatum biflorum and Smilacina racemosa), waterleaf (Hydrophyllum maculatum), desmodium, bedstraw (Galium trifidum), mosses and liverworts. It might also be mentioned that a honey locust (Gleditschia triacanthus), at present twelve feet tall, and a flourishing elderberry bush (Sambucus canadensis) have been acquired in the same manner.

The "downy stemmed anemone" or pasque flower (A. patens

nuttalliana) and the dainty viola blanda of Minnesota and trailing arbutus (Epigwa repens) from North Carolina, New York and Michigan have failed to adapt themselves to the foreign environment, though the pasque flower is native in Iowa; however, I have not known an instance of its being so successfully transplanted that it has bloomed a second summer. On the other hand, the tick trefoil (Desmodium nudiflorum) has almost reached the status of an obnoxious weed. As the fruit trees died and the fad for removing fences reached the town, new quarters became necessary for the wild flowers, and specimens of each kind were successfully removed to another part of the yard.

It may be of interest to note several results of ecological importance which have arisen from this experiment covering a period of thirty years. First, the plants seem to have adapted themselves to an environment somewhat different from that of their native haunts in that they have been removed from rather dense woods to somewhat open ground. Again, they have been tenacious of life; drouth, killing frosts, alternations of winter temperature, that have proved destructive to small fruits, have left the more tender plants unharmed. Again they have not changed at all in appearance, but, with the exception of lungwort, blue phlox and Greek valerian, have been less prolific than in their native woods. Even the columbine, with its wonderful contrivance for scattering seeds, has not increased by a single plant. Not even the most thoroughly established of them all has multiplied as rapidly as a single vine of the common cultivated morning glory would have done in the same time. It has been very evident throughout the experiment that plants do not establish themselves quickly; the order of establishment of plants placed in the garden during the same year seems to have been mertensia, blue phlox, Greek valerian, blue violet and hepatica.

Perhaps the most important of all results has been that, while the experiment has been undertaken with no thought of scientific interest, nevertheless, as the woods have receded farther and farther from the town, in this little garden of a few square feet are being preserved about forty species of our native Iowa flora, several of which have already become extinct in the country round about. A second result, not ecological, is that the children of the vicinity are thus becoming familiar with native flora that might otherwise have remained a sealed book to them as the neighboring groves have disappeared one by one. And last of all, from the morning on which the dainty hepatica first lifts its head from amid the brown covering of leaves, until the last flower of spring has formed its seed, there is a succession of bloom and fragrance and miracles of growth and development that bring the soul of the gardener into the closest communion with nature.

Below is appended a list of native Iowa plants which have

been successfully grown in the garden described in this article. No attempt was made to introduce summer or autumn flowering species, the limits of the garden necessarily forbidding more extensive operations:

Liverleaf (Hepatica triloba). Wood anemone (A. nemorosa). Rue anemone (A. thalictroides). Meadow rue (Thalictrum dioicum). Columbine (Aquilegia canadensis). Larkspur (Delphinium azureum). Climbing clematis (C. virginiana). Buttercup (Ranunculus septentronalis). Bloodroot (Sanguinaria canadensis). Blue phlox (P. divaricata). Greek valerian (Polemonium reptans). Bellwort (Uvularia grandiflora). Cranesbill (Geranium maculatum). Sorrel (Oxalis stricta). Mandrake (Podophyllum peltatum). Violets (V. palmata, V. pubescens and V. pedata). Jack-in-the-pulpit (Arisama triphyllum). Asters, blue and white. Solomon's seal (Polygonatum biflorum). False Solomon's seal (Smilacina stellata). Blue-eyed grass (Sisyrinchium angustifolium). Star grass (Hypoxis erecta). Spiderwort (Tradescantia virginica). Bedstraw (Galium trifidum). Tick trefoil (Desmodium nudiflorum). Five finger (Potentilla canadensis). Waterleaf (Hydrophyllum macrophyllum). Nyctelea (Ellisia nyctelea). Wild strawberry (Fragaria vesca). Lungwort (Mertensia virginica). Squirrel corn (Dicentra cucullaria). Ferns (Adiantum pedatum). (Camptosorus rhyzophyllis). (Polypodium vulgare). (Woodsia obtusa). (Cystopteris). (Asplenium). (Botrychium).

SHALL WE BUY OR RAISE OUR SEEDS.

R. E. DEWEY, ST. LOUIS.

I venture the assertion that only a few years ago when our grandmothers saved seeds of everything that grew in their garden and traded with their neighbors for what they did not raise themselves, that there were more good gardens accordingly than today, when seed raising has been given over to the big grower

and the average garden has to depend on store seeds.

While the rule generally given—that each variety of seeds should be grown where that variety reaches its greatest perfection and though it is possible to raise good seeds in large quantities, better results will be obtained by saving in small lots the best seeds from the best plants in any section where that particular variety makes a satisfactory growth.

This leads to the point: Why should not Iowa raise her own seeds? No intelligent farmer would think of buying his seed corn every year. So, why should a gardener buy his seeds when the cost is several dollars per acre while the seed corn would cost but a few cents per acre, for the difference between seed from carefully selected plants and that usually sold is as great as between selected corn and that saved by the scoop shovel method.

I do not believe that the average farmer with only a small garden can afford to spend much time saving garden seeds, but he can very profitably spend much time learning ways and methods of saving his grain and grass seeds. There is no reason why every gardener should not raise the most of his own seed, and of beet, carrot, sweet corn, cucumber, egg plant, musk and watermelon, onion, parsnip, pepper, pumpkin, radish, salsify, squash, tomato, and turnip, a very profitable business might be worked up. In fact, large quantities of some of these are already grown here.

When you buy seed you get seed saved from all the crop, but if you raise your own seed only the superior plants should be saved for seed. There is some satisfaction, not to mention profit, in knowing that when you plant your own seeds they will grow and come true instead of all the variations of the species.

It is not necessary to raise a seed crop every year as most seeds will hold their vitality for several years, and some are even better for being a few years old. By saving plenty of seed when an extra good crop is secured if an off years results no seed need be saved. Whenever a good crop is secured I like to save seed, as an effort is made to make each crop better than the preceding one. If not as good a crop as your old seeds were saved from, better not save any seeds. Another item. If one is raising several varieties, it is not necessary to isolate each of them every year. By keeping a different variety separate each year, seeds enough of each kind may be saved to last several years.

There is in some plants a constant variation from type and to keep a variety pure a most vigilant watch must be kept up for these variations. If you want to improve the variety any variation for the better must be noted and seed saved from such specimens, but the resulting crop must be isolated and improve-

ments in that direction watched for, not sacrificing any good points the variety may already possess, until the new type is established. Any deviation from the type should be discarded as soon as it makes itself known, as any pollen coming from a plant of different type might change all the resulting seed crop. If you wish to take advantage of any improvement in type, seed from each individual plant should be saved and planted separately. It is best to plant only a small amount of seed from each plant, keeping remainder correspondingly numbered so that the only seeds from the best plants of first selection need be planted the next year. As an illustration, from one plant: a cross between Burpee's and Henderson's Bush Limas, 125 plants were raised but only 27 were worth saving for further trial, the bad qualities of one or both parents being magnified in the other 98. Seeds of each of these 27 were again saved and planted separately, only planting a few of each number. This year's trial shows that less than a dozen are worthy of another year's trial. but all the seed left over from last year of these eleven will be planted next year, only a few seed of the best individual plants being saved this year for next year's trial.

Any crop that is intended for seed should be planted on well prepared land and given the most thorough cultivation, as any setback the plants may get only has a backward tendency on the succeeding crop. It is only by extra cultivation that we can raise extra crops, and extra crops are a long way toward securing an extra quality of seeds which should have unusual vitality.

The main thing to be considered in selecting seed plants is to select the most vigorous plant with least undesirable points and if of a species that readily crosses, all plants not reserved for seed should be pulled out as early in the season as quality makes itself known.

This paper would be too long to give methods of saving all varieties of seed, so will only mention a few general rules.

All seeds should be kept in a cool, dry place and should be

thoroughly dry before being piled up in quantity.

All of the root crops should be from transplanted roots and nothing but smooth roots true to type and a single tap-root should be selected. A coarse overgrown specimen of any crop is worthless for seed purposes.

Those seeds with pulp adhering should be washed thoroughly, and some, such as tomatoes and cucumbers, should be allowed to ferment, stirring occasionally, for if left without the seeds on top will turn black. As soon as pulp will loosen from seeds, they should be washed out and dried as rapidly as possible. Some seeds as onions and phlox, that are heavier than the chaff they are in, may be washed, the chaff and poor seeds staying at top of

water, can be poured off, leaving clean seeds in bottom. By putting on a screen so water may drain off they dry quickly.

Of the early varieties only the earliest, most perfect specimens should be saved. Where lateness is the object, only the nearest perfect plants ripening latest in season should be saved. Only those with the least seed should be saved of varieties that are grown for pulp or stock and where the seed is the part sought for the greatest seed producer, other qualities being equal, is the one to save.

FORESTRY.

A. W. HATFIELD, CORRECTIONVILLE.

The question of the management of our depleted and rapidly disappearing forests is second to no other in importance to the people of the United States. No nation on earth was so blessed in the beginning, with the extent and quality of forests, as our own; but through lax laws and political influence, the mass of our forests have passed into the hands of the few. Not only is the waste and destruction of the original crop distressing, but also the utter disregard for the future that has thus far been the rule.

It is no longer a disputed question that the depletion of the forests causes the extreme high prices of lumber in our markets at the present time. I have the most profound respect for Nature. She has made no mistake in planting trees, all being suited to the conditions surrounding them. While it is possible some foreign trees will thrive for a while; it is not safe to plant other than native trees, except in an experimental way. forested area of southern California is about equal to that of Prussia, where, under governmental control, the annual net profit of \$1.50 per acre is realized. In the Grand Duchy of Baden, the annual net profit is \$2.60 per acre, ten cents annual profit more than our government received for the red-wood forests. One average red-wood tree from California will yield more timber than any acre of the Prussian forests. With all of these facts in sight our government should withdraw from sale every acre of timbered land unsold, and care for it by the bureau of forestry, and have the trees milled only as they are matured. The profits would go far toward the rebuilding of our devasted

What to plant and how to plant must be governed by local conditions. While the economic question of forestry is of vital importance to the whole people, and upon which volumes could be written, the phase of this question, which most concerns the people of northwestern Iowa, is the planting of forest trees for lumber; and as the poor old cottonwood has been reviled in our

meetings in by-gone days, I shall endeavor to prove that the grand old cottonwood is a money-maker. During the past winter there was cut a half million feet of cottonwood lumber in Wolf Creek township, Woodbury county. The trees from which this lumber was cut were all set out sixteen to thirty years ago. Now, then, we will do a little figuring to find out whether this tree setting is profitable or not. I will take for the test a row of trees 120 rods long, which had been grown from cuttings in twenty-five years. This row of trees was cut into stove wood and lumber, producing 42,000 feet of lumber, which sells at \$22.50 per thousand. The expense of chopping and sawing was \$7.00 per thousand, leaving the lumber worth \$15.00 per thousand net. Now, let us see what the lumber was worth from that single row of trees. By computation we find it was worth \$630.00, and there was also two hundred cords of stove wood. which cost twenty-five cents per cord for sawing, which wood when sawed is worth \$2.00 per cord, leaving \$350.00 for wood net, making a total of \$980.00 proceeds. This row of trees was growing twenty-five years and they took two and one-half acres of land, which makes an annual rental of \$19.00 per acre.

By observation and my own experience, I find in order to make a success of growing cottonwood trees for timber, they should be set out in rows north and south. They are a tree that must have plenty of air drainage, then they are much less subject to borers.

Walnuts are also a profitable tree to plant. There are walnut groves in my neighborhood, from seven to ten years planted, that gave good crops of nuts the past season.

We also find that soft maples are a very profitable tree to grow. Mr. Bernard, of Wolf Creek township, Woodbury county, made last spring from one acre of soft maples one hundred gallons of fine syrup.

I will say in conclusion that if anyone will set out a row of cottonwood trees one-half mile long, trees three feet apart in the row, of the yellow cottonwood, cultivate well two years, then let them stand until they are twelve years old, he can saw enough dimension lumber out of it to build all the buildings necessary on any quarter-section farm.

THE NUT FRUITS OF IOWA.

To the People of the State: The undersigned believe that the time has fully come that a united and vigorous effort be made to save the remaining most valuable nut fruits of the state, which are every year being cut down and destroyed.

Fruits that it has taken in the process of natural selection a thousand years and more to produce, and if we permit their destruction will require hundreds of years to restore with the best scientific skill at our command, to their present state of perfection. We refer to the hickorynut, the butternut, and the black walnut; and the pecan in the eastern and lower part of our state should be included. Also the selection and improvement of the chestnut and hazelnut.

So much time is required for the development of these fruits that a zealous, patriotic purpose should be aroused to save these valuable fruits from further destruction. The national government is doing all that it can to aid in saving the highest types of the pecan which abound in the south, and which has required centuries to bring to their present high state of perfection. And shall we of Iowa, and the North, not bestir ourselves to save the hickorynut, a hardy and enduring tree, the equal in quality of fruit of any other nut tree; and of which nature has bequeathed to us large ones and almost as thin shelled varieties as the English walnut? We have reason to hope that the same character may be discovered in the butternut and black walnut if we make diligent search for them.

Many of these best nuts of all sorts have already been destroyed; but enough are left to warrant both the outlay of time and money to preserve them. We should perpetuate this notable-

legacy of native fruits for future generations.

May we not hope that by a united and timely effort on the part of our horticulturists where these fruits most abound, may be induced to offer to the boys and girls under sixteen years of age such liberal premiums as will discover the best of these fruits; and with the further purpose that they will exhibit the best of them in the rotunda of our State House at Des Moines, at the meetings of the State Horticultural and Agricultural Societies next winter, and thus show to the people in this public way this most valuable and very greatly neglected natural product of our state.

CHAS. G. PATTEN.
S. A. BEACH.
C. L. WATROUS.
THOMAS H. MACBRIDE.
A. B. DENNIS.
W. M. BOMBERGER.
WESLEY GREENE.

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MAY 1908

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NO. 5

BORDEAUX MIXTURE AND HOW TO MAKE IT.

BY PROF. S. A. BEACH, IOWA STATE COLLEGE.

Bordeaux mixture has come to be recognized as par excellence the best liquid preparation with which to hold fungous diseases under control, speaking of those diseases that attack our fruit bearing plants. It is a mixture which was accidentally discovered; the hint was obtained from the practical experience of fruit growers in France; it is not something that was first worked out by scientists and then handed over to the fruit growers, but it is something which came from the fruit growers themselves. The story is of interest, it has been told a good many times, but I want to tell it again, as to just how this Bordeaux mixture came to be known.

The French grape growers some years ago found that an American disease was devastating their vineyards; it was the grape mildew, something that had been imported from this country, and was spreading there very rapidly, and causing a great deal of damage. In one of the districts near Bordeaux where grapes were grown, some of the grape growers were bothered by the pilfering of grapes from those vines that stood next to the road; people passing by would help themselves to the fruit, and they determined to do something, if possible, to They did not wish to poison the fruit, but they did wish to make the people who went by believe that they had put something on that would poison them. So they took copper sulphate and mixed it with fresh slacked lime, and with a whisk of twigs spattered it over the grape vines along the road. It so happened that these men had the mildew on their grape vines and the important discovery was made that where this mixture of copper sulphate and lime had been spattered on the vines they did not have nearly so much of the mildew. This fact was reported to Millardet, professor of the faculty of sciences in Bordeaux. From this suggestion he and others worked up the method of making the preparation which we now know as Bordeaux mixture. In 1886, I think it was, our United State Department of Agriculture first took the matter up and

helped to introduce the use of this mixture in this country. We were then told to dissolve six pounds of the copper sulphate and slake four pounds of lime, mix the two together and dilute to twenty-five gallons; that made a mixture in which we had one pound of copper sulphate to make a little over four gallons of the Bordeaux mixture, a very strong mixture, and it was also a difficult mixture to apply, as those of you can testify who had anything to do with making it. We would try to strain that mixture through sieves and gunnysacks and hold our temper and keep from saving our Sunday school lessons the wrong way while doing it, which sometimes was not an easy matter to But with years of experience in using this mixture, we have found some important improvements that are of interest to anybody who has anything to do with it. As you are fruit growers, I take it that the larger proportion of you have, or will have, something to do with this Bordeaux mixture, because it is one of the most efficient weapons that we can use against these fungous diseases which we must fight if we are to be permanently successful in fruit growing.

The first thing I will say about the preparation of the Bordeaux mixture is that instead of weighing out the definite amount of copper sulphate that you need each particular time you use the formula, it is possible to dissolve the copper sulphate beforehand, and know how much you have in solution and measure the number of pounds by the number of gallons you use.

First, with regard to the dissolving of it, if you would hang it in the top of the liquid the way I have hung this here, that is the best way to dissolve it, because as the water takes up the copper sulphate it becomes heavier and drops down to the bottom of the vessel, fresh water which is not charged with copper sulphate takes its place and the operation goes on until the water is saturated with the copper sulphate; whereas, if you drop the copper sulphate in the bottom of the water in the first place it takes a great deal longer to dissolve it. So in dissolving the copper sulphate, hang the copper sulphate in a sack in the top of the water. That is a little point, but it is a good thing to know.

By keeping more of the copper sulphate crystals in the vessel than the water can dissolve we may be sure that we have a saturated solution; that is to say, the water has taken up all the copper sulphate it can hold. In that case, at the ordinary temperatures at which we use water, we have about fifty ounces of copper sulphate in every gallon, practically three pounds to the gallon. So you can, if you choose, dissolve the copper sulphate now in February that you are going to use next summer. So long as you have a saturated solution, more than the water will

take up, you know that every time you dip out a gallon measure of it, you have dipped out practically three pounds and it is not necessary for you to weigh it.

What is the Bordeaux mixture? It is simply a compound made from dissolved copper sulphate and fresh slaked lime. Why do we use the lime with it? The fungicidal properties are in the copper sulphate, not in the lime. It is because of the copper in the mixture that it is injurious to the fungus, not because of the lime in it. Why then do we use the lime? We use the lime to prevent the copper from injuring the foliage. In all this work of using insecticides and fungicides, the difficulty is to find something that will prevent the fungus from growing or that will kill the insect without at the same time injuring the foliage that we are working on. It is easy enough to find plenty of things that will kill the insects and kill the fungi, but the difficulty is to find something that will do that without injuring the foliage. Bordeaux mixture does not always do that. Sometimes we get some injury to the foliage by the use of Bordeaux mixture. But the copper sulphate solution is decidedly more injurious to the foliage, so we use lime to combine with the copper sulphate and make a mixture that will not injure the foliage. The least amount of lime which it is safe to use is about two-thirds as much by weight of the stone lime as you have of the copper sulphate. That is a safe proportion; it will supply more than enough lime to combine with the copper sulphate. Thus the formula which calls for six pounds of copper sulphate, and four pounds of lime, is safe because it provides more than enough lime to combine with the copper sulphate. But if we have dissolved the copper sulphate so we can measure the number of pounds of dissolved copper sulphate by the gallon measure.

Is there not also some way in which we may tell whether we have enough of the lime so that it will not be necessary to weigh the lime each time? If so, it has an advantage because in slaking the lime for the Bordeaux mixture it is best not to use it at once, just the minute that it has slaked. If you do you will find more grit in it then than you will if you let it remain a little while to become more thoroughly slaked. When masons slake lime for making plaster they prefer to let it remain a while after slaking before they use it. In making Bordeaux mixture it is also best to let it remain an hour or two in slaking so that all through it the fine particles will become slaked.

If we do slake the lime beforehand, how can we tell when we have enough lime to combine with the copper sulphate? By a very simple test. I have here a poisonous substance, a yellow crystal, which is called prussiate of potash; the chemists call it

by the name of potassium ferrocyanide. Five cents worth of it should be enough to last a man through the spraying season. Dissolve and it is ready for use. A little of it put in the mixture will find any of the free copper sulphate. In using this, all that is necessary is to drop a drop of it into the Bordeaux mixture which you have made, and it will show a dark color when there is not enough lime, but if there is lime enough it does not change color. By using this test we are enabled to dissolve the copper sulphate beforehand; we are also enabled to slake the lime beforehand; we can if we choose slake enough to last for a week at a time because at any time we can tell by this test whether we have enough lime in the Bordeaux mixture.

Now, one point more. As an extra precaution to prevent possible injury to the foliage, it is well to have an excess of lime, particularly if you are using with it, as we usually do now, Paris green or some other arsenical poison against the insects. So after you have tested the Bordeaux mixture and find that you have enough lime, being sure, of course, that it is stirred thoroughly before making the test, then add some more lime, so that you will be doubly sure that there will be no injury to the foliage on that account.

The 4-4 formula calls for an equal weight of copper sulphate and lime. It is a safe measure; in fact, it is a disadvantage to use greatly more than that, because if you use too much lime it tends to counteract the fungicidal action of the mixture and so it is not well to use lime in too great an excess. An equal weight of copper sulphate and of lime is a very good rule. By a little practice in following the plan which I have given you can tell just about how much extra lime you will need to add in order to make your formula correspond to the one having ingredients of equal weight such as the 4-4 formula.

A word with reference to the strength of the Bordeaux mixture. As it was first used it was altogether stronger than needful in combating fungous diseases. The strength of the Bordeaux mixture can be varied to suit conditions. If you are spraying for the potato blight, you need a stronger mixture than you do if you are spraying apples for apple scab or peaches for peach curl. In spraying the apple orchards, a Bordeaux mixture which contains four pounds to forty-five gallons, or even four pounds to fifty gallons, is strong enough for all ordinary conditions. But if you are spraying potatoes for the blight, I would advise you to use one pound of copper sulphate to make eight or even seven gallons of mixture. That is to say, you would use six pounds of copper sulphate in spraying potatoes for blight, whereas in the apple orchard you would use but four pounds for an ordinary fifty gallon barrel. The ordinary kero-

sene barrel will hold a little over fifty gallons usually, and when conveniently full it will hold from forty-five to fifty gallons.

There is a very important point about the way in which the mixture is put together. I wish to call your attention in particular to that. The good housewife can take flour and water and perhaps a little salt, possibly a little bit of sugar and some yeast and she will handle it so as to make good bread, where you and I would make a botch of it. We may use the same materials, but we do not manipulate them in the same way and we do not get the same results. There is just about as much difference as that between the right way and wrong way of making Bordeaux mixture. If you make Bordeaux mixture one way, it is a mixture which settles rapidly to the bottom of the barrel at once, which needs to be agitated all the while in order to have it put on at all satisfactorily. For various other reasons it is not as desirable a mixture to use as the Bordeaux mixture is when it is made properly. Now, the directions which we received when we first began to work with the Bordeaux mixture was to dissolve the copper sulphate, put that in a barrel; slake the lime and put that in the barrel, and then dilute the whole mixture to twenty-five gallons, and this was the way we did it. Now we will take the copper sulphate and first, before putting in the lime, we will dilute it to about one-half of the amount required to fill the formula. We will also dilute the lime to about one-half of the amount required, and then, having both of them so diluted, we will pour the two together. Now that is the Bordeaux mixture made in the proper way. You can see the difference that it makes in the kind of mixture that is obtained, whether the ingredients come together diluted or whether they come together in concentrated form. which was made in concentrated form will settle down, whereas the other which was made in diluted form can stand from a half hour to an hour without settling but a very little.

Notice with regard to the use of the Paris green or other insecticides, which are combined with the Bordeaux mixture that having made the Bordeaux mixture in this way by bringing together the two ingredients in dilute form, lastly we add the Paris green. The reason for this is that the Bordeaux mixture is composed of a sticky compound which is in suspension all through the liquid. When the Paris green is put in last, that sticky substance holds it pretty well in suspension all through the liquid. Paris green is very heavy. If you do not believe it, put some in a tumbler of water and see how quickly it settles down to the bottom of the tumbler. When spraying Paris green on potatoes or on fruit trees, it is more essential than many think to keep the mixture thoroughly stirred in order to

insure its even distribution and to prevent injury to the foliage. The other day I had a letter from a gentleman living in Iowa who has about a hundred and sixty acres of apple orchard which he sprayed last summer. He sent me some samples of the leaves and complained about the fact that in spite of spraying the leaves showed that they were injured. An examination showed where the spray mixture had collected along the lower side of the leaf and killed the tissues; in some cases along the lower edge, in other cases on the tips of the leaves it showed where the mixture had run down and evaporated. Being thus made of concentrated strength, it burned the tissue. You will find a great deal more trouble of this kind where you do not keep the mixture thoroughly stirred all of the while that you are making the application of the arsenical poison. Too many people in spraying potatoes with Paris green burn the foliage without realizing the amount of injury that they do in that way. In using Paris green, put it in last, so that the Bordeaux mixture will help to hold it up in suspension.

It is not necessary, however, to use as heavy a substance as Paris green for poisoning the insects. You can use the arsenate of lead, which although more expensive, can be put upon more tender foliage, that is, foliage that is particularly susceptible to injury from arsenical spray, like plum foliage, with greater safety than you can put on Paris green. It is sometimes called disparene, or rather disparene is a trade name for it. But you can yourself prepare an arsenical which will be less expensive than the Paris green, and if you are using it in any considerable quantity it will doubtless pay you to do so. Get ordinary white arsenic which, when bought in quantity, can be purchased very cheaply. Boil it with common sal soda, the washing soda, in order to dissolve the arsenic. This gives an arsenite of soda which can be used by putting it right into the Bordeaux mix-Be sure that you have an excess of lime so that the arsenical will not burn the foliage. It can be used in place of the Paris green at the rate of one pound of white arsenic, where your formula calls for two pounds of the Paris green. to say, if your formula for spraying the apple orchard calls for one pound of the Paris green to 150 gallons, you can use instead a quantity of this arsenical solution equivalent to onehalf pound of white arsenic, because the white arsenic is twice as strong as the Paris green. It can be boiled as just directed and then put away and kept indefinitely. By knowing just how many pounds of white arsenic you have in a certain number of gallons of this liquid, you can measure it out by the pint or by the quart and know exactly the equivalent amount of white arsenic which that pint or quart represents. In that way you can use it against all leafeating insects, such as the codling moth, tent caterpillar, the potato beetle and other insects which injure the foliage by eating it. This, when used with Bordeaux mixture, should also be put in after the Bordeaux mixture is made.

Summarizing what I have said on this matter, notice:

We can dissolve the copper sulphate readily and keep it in solution, and approximately know the number of pounds we have in solution if we keep the solution saturated. You can of course dissolve, say, fifty pounds of the copper sulphate in twenty-five gallons and know that you have two pounds in every gallon, but if you leave that exposed to the air, gradually it will evaporate, and if you give it time it will evaporate until it contains about three pounds to every gallon, whereas, if you use a saturated solution in the first place it does not matter how much it evaporates because the solution can get no stronger.

We can slake the lime beforehand and know how much lime we have by using the ferrocyanide test to show how much is required to combine with the copper sulphate.

We can prepare the Bordeaux mixture so that it will make a heavy mixture that will settle quickly to the bottom if we choose to do so by combining the ingredients in concentrated form, or if we choose to follow a better plan and combine the ingredients in as dilute form as possible we can prepare a Bordeaux mixture which will hold up so that it needs less agitating.

We can greatly add to the uniformity of the distribution of the Paris green or other arsenical if we add it the last thing after the Bordeaux is made.

ORCHARD SPRAYING.

F. O. HARRINGTON, WILLIAMSBURG.

That the fruit grower has reached a point at which it is absolutely essential to use the sprayer in order to grow even reasonably perfect fruits of the orchard, admits of no discussion, for it is a self-evident fact potent to even the most casual observer, but the whole spraying business is in some sense, in a transitive stage and by no manner of means can it be claimed to have reached perfection, for often we fail, at least in part, of the desired effect. There are so many conditions entering into the combination and any one of them lacking its proper place, or time, creates lack of harmonious action, and the result is unsatisfactory. Given an absolutely perfect spraying solution, and a bad method of application, or the time being inoppor-

tune, or the weather conditions unfavorable, and we have largely lost, not only the solution, time, and labor spraying the same, but the opportunity for an effective application is also lost, in some cases without knowing it. Of course, the whole subject of spraying from the standpoint of the common farmer, or householder with a few trees, is for the most part a different problem from that of the commercial grower, though the need in each case is the same, but it is a far more difficult task to convince the half acre orchard owner that he can afford to take the time and trouble to equip himself to attend to this important matter. If he cannot see the actual cash being turned into his pocket, he will not do it, for many of our people do not realize how important a matter it really is to provide a plentiful supply of fruits and vegetables for the use of the family and the dietetic importance of so doing.

INSECTICIDES.

Paris green has never been in favor with me. Its specific gravity is such that it is very difficult to keep it in suspension. Added to this, it is so variable in composition, so often adulterated that one does not know when he is accomplishing some good or simply wasting valuable time and muscle. As a case in point, a prominent orchardist in central Illinois, three or four years ago, used three hundred pounds of Paris green on his orchard of probably one hundred fifty acres, which means about twelve hundred barrels of fifty gallons each, spread upon the trees in the form of fine spray, requiring, as you may readily believe, no small amount of valuable time, but he found at the end of the season that this Paris green was so badly adulterated that it really amounted to nothing, and his fruit was exceedingly wormy that year, and the loss in labor, and then the loss in quantity and quality of fruit was, to say the least, very discouraging. A sample of this Paris green analyzed later on told the whole story of adulteration and deceit.

For some years I used London purple, which remains much better in suspension, but still liable to the same objection of variability as it is simply a waste product. Then I used paragrene, which I liked still better, remaining still better in suspension and was not, so far as I was able to ascertain, variable in composition. In 1904, I purchased and used green arsenoid, and with excellent results. Its specific gravity is but about half that of Paris green, making it easy to keep in suspension. But arsenate of lead in the form and name of disparene, became the watchword of the supposedly progressive orchardist, and so, not to be a back number, I tried that this season. Now I am not going to place all the blame for less successful results this season to the score of disparene, for I freely admit that with any

other insecticide, the results would probably have been the same. The season was peculiarly unfortunate for spraying purposes. Far too much rainfall, and swampy spots in the orchard, where I had never seen them before, precluding the use of the heavy spraying machine, for I am using the Orchard Monarch sprocket geared, power machine, one hundred fifty gallon tank.

At the proper time to spray after the fall of the flower petals, we simply could not go into the orchard with the team and machine, and did not spray for more than a week after it ought to have been done, and the washing rains cleaned away our work. but there was one fault, and a serious one, that I must charge up to the disparene. I had a hundred pound keg come early in April and when opened found it much dried out and hardened, and it was simply a fright to get that stuff thoroughly dissolved. ready to mix with my Bordeaux mixture. If any of you have tried to mix up half dried white lead with oil, into a smoothly flowing paint, you will understand what kind of a job I had to mix that disparene. I thought an old fashioned paint mill for regrinding would have been a great convenience. that might have been a keg of left over material and that the next keg might be all right, I ordered another hundred pound keg, which proved to be ditto. By the time that lot was used up, I had become disgusted with disparene, and finished the season's spraying with green arsenoid for the insecticide.

I was unable to see that it adhered to the foliage a bit better than the Bordeaux does all the time when rightly made. Possible, if one were spraying with an insecticide only, disparene would be found to adhere more tenaciously than other materials. It ought to have some advantage over the other poisons as it costs from twelve to twenty times as much for the same amount of spraying, as ordinarily with the others, four, or at most five ounces is used with fifty gallons of mixture, while with disparene from three to five pounds are required for same amount. The cost per pound is about the same for disparene, London purple, Paragrene and green arsenoid, Paris green costing a little more. I have been using four and one-half to five ounces of Paragrene and the arsenoid and have seen no ill effect on the apple, but on peach and plum, I have had a little burning of foliage where a 4x4 solution of Bordeaux was used. Ordinarily I use a 3x4 solution on both these trees. I think for the coming season. I will either go back to green arsenoid, or else make and use arsenite of lime, that is a combination of white arsenic and sal soda, boiled until dissolved.

BORDEAUX MIXTURE.

As I am not writing for experts, for they are not in need of such information as I could give them, I will give a little ex-

perience in making Bordeaux, thinking my experience may smooth away some of the difficulties for the amateur. The sulphate of copper is easily dissolved in a few hours, by hanging it in the surface of the water in any wooden receptacle used for that purpose, but if wanted quickly must be dissolved with hot By anticipating twelve hours ahead one needs not to bother with the hot water. For the orchard spraying I use two kerosene barrels, in each of which is dissolved fifty pounds of the sulphate making solution of the strength of one pound per gallon, and as many pounds as are to be used in making a tank of Bordeaux, are readily dipped out as gallons, but the lime solution is not always as satisfactory. In the first place it is sometimes difficult to obtain lime that is suitable for the purpose, as it should have the property of dissolving very minutely and perfectly, which not all lime possesses, and it should slack readily and quickly, and should be free from stone that will not slack.

While I was using the barrel sprayer, I slacked the requisite amount of lime for each barrel in a tub formed of half a barrel sawed in two, by putting enough water to cover the lime deeply immersed, and it was ready for use on our return for a fresh barrel of Bordeaux. Being fully diluted and stirred, it was run through a burlap strainer and the two dilutions mixed, though all that time I was not so particular about having the mixtures fully diluted before mixing. This method of straining was far from perfect, and we frequently had a little trouble

from clogged nozzles in the orchard.

Three years ago next spring, I purchased the power sprayer referred to, but had a rather unsatisfactory system of making and handling the mixtures prior to using in the machine, but two years ago I purchased a two hundred gallon barrel or casque in which nut oil had been shipped from China. This was mounted upon a platform about eight feet high, and close to water tank at stock yard, the casque lying on its side. Underneath at the bilge of casque was inserted a long screw (pipe connection) and with an angle valve as a shut off, and about six feet of two inch hose which reaches to the sprayer tank driven beside the elevated platform. Three and one-half feet higher and extending back is another platform about 8x12 feet upon which are the separate diluting tanks, slacking tubs. etc., needed for use there, and a large bore wood pump is set down at extreme end of the platform into the edge of the water tank below. From this pump, movable spouting runs to the different receptacles for mixing, diluting, or slacking. A slacking box was made in which to slack a whole barrel of lime at once. which I slacked with care in the old way of constant stirring and adding in of water until all was slacked, then diluting enough to have it remain thin mortar, and keeping a little water over it, and dipped out of this lime tank the amount required for each tank full of Bordeaux. The two diluting tables are set close together on the edge of the platform next the large casque, in the top of which a square hole was cut large enough to have set into it a strainer 12x16 inches square and 12 inches deep, the bottom being brass wire cloth. From the top of this strainer to the bottom of the diluting tanks is a tapering, flat bottomed trough, or sluice-way about three feet long, and wide enough next to the diluting tanks to receive the flow from both at same time through common molasses gates screwed into them close to their bottoms. thus a shallow stream from each mingle together as they flow. and passing through the strainer are still further and more thoroughly blended together. Opening the valve at the bottom of the large casque, the liquid passes through hose into another strainer of same material as the other and into the machine tank and is ready for use and no clogging of nozzle with mixture strained thus. However, with the lime slacked as I described in bulk, we had serious trouble and much loss of time, in getting the liquid through the strainers because of the lime solution containing so much of lime not finely separated and dissolved. had always been told by masons that the process of slacking lime by constant stirring and adding water was the only right way, but they will need to tell that to some other man hereafter. for this season I have slacked lime for each tankful separately by filling a half barrel tub two-thirds full of water then dumping the fifteen pounds of lime required into it, with no further attention. You will notice that I use an excess of lime as in mixing 4x4 Bordeaux mixture, but twelve pounds of the lime would be required. When ready to mix the next tankful, this tub of lime was stirred up and by two men picked up bodily, and the liquid turned into the lime diluting tank, but stopping before the dregs flow out, a little more water turned in, stirred and poured out as before, and the small amount of residue dumped out over the end of the platform. Though the same screens are used we had no trouble with the straining. Contrary to my former opinions, I am thoroughly satisfied that by slacking lime entirely under water, with no stirring at all, that it will be more thoroughly slacked and remain much better in suspension with the water afterward, and also that it will adhere better when applied on anything, either as whitewash or spray material. The stirring of the lime while in process of slacking allows ingress of air and it is really in part air slacked, and by some process which I cannot explain, forms quite an amount of small granules. not noticeable for ordinary uses but which make trouble in fine screens, or if coarse ones are used, then afterward in the spraying nozzles.

Slacked as I now do, there is very little residue left and that little is not turned into the diluting tank. You need not be afraid of burning the lime in this way, though I had believed that would be the natural result; keep it entirely covered with water and do not touch it until after thorough slacking, then stir up. Sometimes trifling matters of detail save much, or cost much in results. With perfectly strained mixtures one may use an excess of lime without any after trouble of clogging nozzles, and that is the only objection to the use of an excess of lime. It is an additional safeguard against having any free acid left in the Bordeaux to create havoc with tender growing leaf structures, but one should not depend even upon this, but should test each tankful, either with a slip of blue litmus paper, or else with a few drops of a solution of ferryocyanide of potassium, either of which will readily detect any acidity.

APPLICATION OF LIQUID SPRAY.

In order to spray most successfully, we must have a fine spray, and in order to obtain a fine spray we must have the pressure, and right here comes in the great value of power sprayers of some kind. The higher pressure we use the better spraying it will do up to the limit of safety to machinery, hose, etc., it puts it into the crevices where it would not go with low pressure, then too a great deal of material is saved because it more thoroughly atomizes the fluid, so that one can cover the tree with less material, and one also saves much in time. To sum up in a nut-shell, high pressure does more thorough work, therefore produces more satisfactory results. One hundred pounds produces good results, though one hundred twenty-five to one hundred fifty pounds would do better.

I do not wish by these statements to discourage the ordinary husbandman with but a very limited amount of fruit trees and plants, and cause him to believe that he can accomplish no good at all with the simpler and more inexpensive sprayers in which no very good high pressure can be obtained, rather would I encourage him to do the best he may with what his limited stock will warrant him in purchasing, for he can very materially hold his plant enemies in check. For such a very satisfactory little knapsack sprayer called the "Auto Spray" in which compressed air is the motive power for spraying, is comparatively inexpensive, and does nicely for a moderate amount of work. I have been using one for spraying my ginseng beds, currant and gooseberry bushes and various other things when I do not need or could not conveniently use the larger machine or the mounted barrel sprayer.

DUST SPRAY.

The concensus of opinion among the orchardists in Missouri,

where the dust spray has been most and largest in use, seems to be that so far as the codling moth is concerned, the dusty spray, if carefully applied is fairly successful, though not uniformly so, but for apple scab and all other fungous diseases it is of little use, while in that section it will be continued in use on hilly lands where it is not convenient to haul the liquids, and also where water cannot readily be had in sufficient quantites, and there is quite an amount of such orchard lands in Missouri, but nevertheless, liquid spray must continue to be the main reliance for the orchardist, where the main orchard insect pests and fungous diseases have obtained a foothold, as they will in all sections sooner or later, sooner in most cases. The State Experiment Station of Illinois, has made quite thorough tests relative to the efficacy of the dust spray in the apple orchard, but with somewhat unsatisfactory results, wholly so as regards fungi. The Michigan Station likewise tested the dust spray many years, and with like results, and so also did our Iowa Experiment Station, but I think not to such an extent, but the results were the same. Nevertheless, I think the family orchardist could profitably use the dust sprayer, where he could not be induced to attempt liquid spraying. By buying his dust spray already prepared, as he may readily do now, he could use the dust spray with little loss of time, and I would commend this matter to his careful consideration.

THE NEW BORDEAUX.

Owing to many conditions that arise and cause annovance in the making of Bordeaux by using lime, it should be a relief if a perfect substitute can be found, and be at the same time inexpensive. A new Bordeaux is now being made, a sal-copper sulphate combination, and its preparation and use is so simple and convenient, and has been used with remarkable and highly satisfactory results. It does not burn the foliage and spreads uniformly over the surface of the leaves, and adheres well, in fact remarkably so. The lime substitute is sal soda, which is the common washing soda. This can be purchased by the barrel, by wholesale, at about a cent a pound, and even when bought at the groceries at your home, can be had quite cheaply. In one barrel dissolve six pounds of sulphate of copper (which you will notice is pretty strong solution) in twentyfive gallons of water. In another seven and one-half pounds of sal soda, same amount of water; when all is dissolved simply empty the soda solution into the sulphate solution, of course, with proper stirring. In its general appearance this mixture resembles the old Boredaux but is supposed to be stronger and quicker in its effects. On standing awhile, it will settle, as does the old mixture. It can be tested by the use of ferrocyanide of

potassium solution, or with litmus paper. It is said to have been used of the strength of eight pounds of copper sulphate and ten pounds of sal soda, without harmful results. I think I shall experiment a little with this new mixture the coming season.

TIME OF SPRAYING.

The manner of application is important, but the most important element in spraying after having the proper mixtures prepared, is the time of application. Prior to the last three years, my first spraying was timed as far as convenient to the time immediately after the fall of the blossom petals, the second ten days later to two weeks and the third two weeks still later. Since that time, I have been doing some spraying before the blossoming period, and I have reached the conclusion that an application of Bordeaux (not forgetting the poison) at the period a little before the opening of the bloom, but after the blossom buds are all plainly in view, is the most important application given in the season, excepting only for the destruction of the codling worm, but the second application made at once after fall of petals, if thorough and the weather conditions favorable, will very materially reduce their ravages, and if no other spraying is made, these two will have accomplished very material results toward the production of a crop of good fruit. Undoubtedly, it will pay to have much more spraying done, but these are the important applications.

In case of the curculio, the first spray at period named, is about the only one that accomplishes any marked results. In the matter of controlling the monilia, as the rot of the fruit of the cherry and plum is called, demands a different period of Spraying the trees prior to blossoming accomapplication. plishes much in reducing the curculio and in destroying the spores of the rot which have remained dormant upon the trees since the previous season, and spraying should be frequent after the fruit attains a partial growth, even up to the ripening, though the later applications should be of copper carbonate in-

stead of Bordeaux to avoid staining the fruit.

I have tried, in my imperfect way, to give some of the salient points on orchard spraying, and conclude by stating that environment and weather conditions are important elements to be reckoned with, but the men who do the work, much more so. I have never had any one perform this work to my entire satis-

faction.

THE SWEET POTATO.

W. F. STEIGERWALT, CARROLL.

In the southern states the Sweet Potato is a staple article of diet and a necessity. At the north it is only an occasionl luxury in some homes and in many it is even unknown.

It is doubtful if there is one farmer in twenty, in the north half of Iowa that raises sweet potatoes even for his own use. Yet a crop with proper care and culture is as sure as a crop of corn. No bugs will bother the vines. Sometimes the cut worms will injure the young plants, but that can be almost entirely pre-

vented by proper cultivation.

Good garden soil not over rich but slightly sandy, will make an ideal spot for the plant. The ground should be plowed quite deep the latter part of November and in the Spring as soon as the frost is out of the ground deep enough, and the soil is dry, the disc and harrow should be used frequently. This will almost entirely destroy the larva that produce the cut worms, if there are any in the soil.

I used to ridge the ground with the plow and plant on the ridges, but I have discarded that method over ten years ago. Sometimes I do not even plow the ground again in the Spring, but prepare it entirely with the disc harrow and plank float, then mark out three and a half feet apart and set the plants about fifteen inches apart in the row, using a little water with each plant if the soil is dry. If the ground is compact by excessive rains, is should be plowed again just before planting. The best time to set out plants is on cloudy days, or just before a rain, or toward evening. Any person who can manage cabbage and tomato plants successfully, will succeed with sweet potato plants.

My object in not using ridges but plant on the level, is the ease of cultivation with the cultivator, hoe and rake. The tubers will also be of better shape, short and compact. Nearly all greenhouses sprout sweet potato plant which can be bought for about thirty cents a hundred or less by taking three or four hundred, and that amount of plants well cared for will produce enough

potatoes for a family several months.

The season has a great deal to do with the quality of the crop. In extremely wet seasons the quality is not as good as when the rains are less frequent, and less than an inch of water at a time.

Where several acres are planted, it is cheaper for a man to get a barrel of potatoes in the spring from some seed-house and sprout his own plants and set them out as fast as the plants get large enough, from the 25th of May to the middle of June.

The Editor's Page.

A summary of the reports for May on the condition of the

fruit crop is as follows:

Apples, 50 per cent; pears, 44 per cent; American plums, 47 per cent; European plums. 27 per cent; Japanese plums, 18 per cent; cherries, 46 per cent; peaches, 32 per cent; grapes, 60 per cent; red raspberries, 57 per cent; black raspberries, 61 per cent; blackberries, 75 per cent; currants, 70 per cent; gooseberries, 62 per cent; strawberries, 73 per cent of a full crop. The estimate is from 5 to 40 per cent less than for April, and not much different from the estimate of May, 1907.

The section of the state south and west of the Des Moines river has suffered most from frost injury. Very little damage to the blossoms, by the recent freeze, has been reported from the northeastern part of the state and a normal crop of fruit

may be expected from that section.

We have given most of the space in this month's issue to a discussion of the Bordeaux mixture. Spraying is not the most enjoyable work about the place, but is not so bad as you imagine it to be when you enter earnestly into the spirit of spraying; when you know what to do and how to do it the disagreeable features disappear. Copper sulphate is the best fungicide for general use that has been discovered. Possibly a better one may be found, but until that time arrives we must be content with the copper solution. The Bordeaux mixture should be used in the potato field as well as in the orchard. Many dollars are lost annually by potato growers from blight that could have been prevented, at least in part, by the timely use of a fungicide.

For leaf-eating insects arsenic, in some form, is still the best insecticide. For sucking insects, kerosene emulsion, tobacco infusion, hellebore and pyrethrum are the most in favor among gardeners.

What a wealth of bloom and fragrance the lilacs give us! "That old friends are the best friends" is true of this shrub. Among the many new forms there are none better than the common lilac. How the humble bees love to cling to its petals and probe for nectar. The plant is hardy and healthy, seldom attacked by fungus or insects. The borer is its worst enemy.

The Red-bud, a native of our woodlands, is worthy of more extended planting.

The Japan quince is a showy plant when covered with its bright flowers, but young plants do not bloom freely. On black prairie soil they do not flower as profusely as on the clay bluffs.

Prunus triloba is well at the head of the list of ornamental plums. It may not be hardy enough to stand the winters in northern Iowa, but should do well wherever the peach can be grown.

In setting potted plants in the garden, see to it that the ball of earth is moist before it is planted, then pack the soil firmly about it. Many a plant has suffered for water before it could make roots into the adjoining soil. The best way to firm the soil about the plant is to put one foot on each side of it, with the whole weight of the body. After the planting is done rake out the foot marks.

WILL YOU CO-OPERATE?

For a great many years the writer has kept careful notes on the abundance and distribution of parasitic fungus diseases in Iowa. This work to be of any especial value should be kept up for a long period of years. The absence or presence of fungous diseases is determined in a large measure by the character of the weather, soil, and variety of plants. In order to make this work of the greatest possible value to the fruit growers of Iowa, it would be well to co-operate with the horticulturists. and may I ask therefore that your paper will be open for a discussion of plant diseases as the members of the Iowa Horticultural Society send them to me?

May I ask that those who are interested in this subject will send specimens to me? I shall be glad to answer through the columns of your journal. I shall also be pleased to send franks to any who are anxious to co-operate with me. Let us have observations on these fungous diseases; thus we noted a few days ago in this vicinity that the cedar apple fungus was shedding its spores.

I hope, therefore, that members of the society will not be surprised if in the course of the next few weeks they should receive letters from me asking for their co-operation.

Yours truly, L. H. PAMMEL.

A QUERY ANSWERED.

Dear Sir: In response to your recent inquiry I would suggest that you write the Fruitman and Gardener of Mount Vernon, Iowa, and the Fruit Grower, St. Joseph, Missouri, requesting sample copies of their papers. These are horticultural papers which circulate in this state. You may also write Mr. Wesley Greene, State House, Des Moines, Iowa, for a copy of the Iowa Horticulture. This is a monthly publication sent free to all members of the State Society. A membership, including the magazine, costs but one dollar (\$1.00) a year.

Very truly yours, A. T. ERWIN.

VEGETABLE AND FRUIT SALADS.

BY MISS RUTH MORRISON, AMES.

It is Shakespeare who says we may find "tongues in trees, books in the running brooks, sermons in stones, and good in everything." There may be a few who care not for Mother Nature and her many interesting children, but you may be assured it is not the horticulturist. He is ever pointing out to us those beauties and helping us to apply them to our lawns—besides this, he is making it possible for the housewife to place those vegetables and fruits upon her table that give to her household brawn and brain.

The growing of the vegetables and fruits take forethought

and study, so do their preparation for the table.

Do the women of our land realize that into their hands are placed the welfare of our nation? What is placed upon the table, the material and the way it is cooked—tells how the members of that family will be able to accomplish their day's duty—or as Theodore Childs has put it: "A man or woman who invites you to dine is responsible for your health and happiness as long as the hospitality lasts;—and even afterward."

Murray says that the salad is the "Prince of the Menu" and although a dinner be perfect in every other detail except the salad, the meal will be voted a failure if that be poor. Then let great care be taken that the "Prince" be not wanting at our

table.

What is a salad? One author has said: "After reflection, we can not limit the term salad more closely than as a preparation of food to be eaten cold, one or more of whose ingredients have been obtained from the vegetable kingdom," or "A salad is a dish composed of certain herbs or vegetables seasoned with salt, pepper, oil and some acid element."

We speak of fruit salads, which are made from oranges, pineapples and other acid fruits—served with sugar or a salad

dressing.

Three centuries ago very fine vegetables and salad plants were cultivated in England; they came from Holland and Flanders. A great change has taken place in regard to the use of fresh vegetables and now, in English speaking countries, great quantities of vegetables and salad plants are to be found in all the markets—home grown. Notwithstanding the quantity of salads eaten elsewhere, they amount proportionately only to a fractional part of the mass consumed in France. For, there, they are grown not merely as a rich man's luxury, but as the sustenance of the laborer.

Some one has said: "Salads cool without weakening and comfort without irritating. I even hold it helps people to grow

young again."

A Frenchman thinks he can not eat his dinner without his salad. Americans are rapidly adopting this idea. It would be well if all nations had the same appreciation of this most wholesome, refreshing and at the same time most economical dish. A salad made from a succulent green vegetable with French dressing should be seen on the dinner table in every well regulated house three hundred and sixty-five times a year. The digestive organs can not do their work properly unless a certain amount of food is taken within the stomach—a salad helps to from this amount; besides helping to form this bulk these green vegetables contain the salts necessary for good blood; for in cooking nearly all the natural salt is taken out of the vegetables; the oil is an easily digested form of fatty matter. Since fats are essential for growth and nutrition as well as force production, fatty foods must be taken in some form; the lemon juice gives us sufficient acid; therefore simple salads are exceedingly wholesome, grateful to the taste and pleasing to the sight, and their value among all classes as hygienic and æsthetic agents can scarcely be overestimated.

While working out my thesis under the direction of the professor of domestic economy—Miss Coburn and Prof. John Craig of the Horticultural Department of the Iowa State College—the available information was studied upon the subject of salads and of each separate material that is here used in salad making.

Investigations were made as to what materials are within reach of the Iowa housekeeper and attempt has been made to determine the place of salads in the average dietary; and the various accepted ways of making salads were studied and practiced—all with a view to determining whether salads, considered from the physiological, pecuniary, æsthetic and labor standpoint, can be economically included in the daily food provision.

The materials from which vegetables and fruit salads are made are of great variety. We may use the fruits and vegetables separately or two or more of these materials may be combined. In this way salads may be provided for all the seasons

of the year.

Fruit salads in season are delicious, wholesome and attractive. An almost endless variety of them can be made by judicious mixing and mingling of fruits and fruit juices. Bananas, oranges, lemons, peaches, pears, pineapples, currants and all kinds of small fruit and berries make desirable salads, served either as simple or compound salads, and the art of the cook is chiefly displayed in selecting proper materials to mix together and in choosing a suitable dressing for them.

The same general principals that govern the preparation of fruit salads will apply in the preparation of vegetable salads.

The salads made from vegetables may be classified under two heads, the uncooked vegetables such as lettuce, endive, cress. white mustard and corn salad plant; the cooked vegetables such as potatoes, beans, peas, beets, cauliflower and cabbage. Doubtless all vegetables ought to be fresh, but with salad plants that are to be used uncooked the demand is imperative. A good salad cannot be made from wilted or stale plants. For this reason the best green salads are practically prohibited to people who do not have their own gardens or in reach of a good market gar-The plants should be freshly picked within half an hour of meal time; each leaf should be carefully looked over, discarding all but the center leaves which are bleached best and are most tender. Up to this time they should have been grown rapidly and vigorously. A rich spot of ground, plenty of water, clean and thorough culture, with favorable weather, must combine for best results. A salad that requires powerful and prolonged mastication is a nuisance and to eat such is a waste of time. Most of the true salad plants reach edible maturity so quickly that any reasonable attention should secure good returns. Here again it is not time and money that are required for success, but a little thoughtful promptness of action.

Many fine salads may be made of cooked vegetables. These vegetables should be cooked separately in salted water, plunged into cold water (except potatoes) and thoroughly drained before placing in the salad bowl. Every American household is acquainted with the dish called "greens." This is properly a salad of boiled plants, for the other ingredients of a salad are supplied by fat pork or butter, boiled eggs, salt, pepper and vinegar. Sometimes beets are grown for this purpose, but oftener dandelion, pig weeds and other self-grown herbs are the sole reliance. Plants that are good for "greens" and which may be grown in the garden are swiss chard, spinach, endive,

kale and mustard.

The salad dressing should not be the prominent or main feature of a salad. It should only be a dressing, an adjunct to tone down and soften too sharp an acid or too pungent a flavor; or to render finer and more distinctive, some peculiar individuality of the fruit or vegetable that composes the salad. This is the true mission of dressing. And a salad dressing, scientifically prepared, brings out and develops the native characteristics of the various materials used and crowns with perfectness the harmoniously compounded salad.

Any manufactured vinegar is too strong for uncooked salads; in its stead lemon juice is preferred. In fact, unless one can make sure of obtaining real wine vinegar, lemon juice should be used for all salads; it is the most delicate and deliciously per-

fumed acid that nature has given the cook.

It is undesirable to use the powdered pepper, that can be bought at the grocer's and which has generally lost all its flavor before it reaches the depth of the pepper castor. The only pepper worthy to be used by civilized man is that ground out of the pepper corn, at the moment used, in a little wooden hand mill.

Olive oil, pure, is pale yellow or yellowish-green, perfectly transparent, with a faint agreeable odor and taste. Olive oil,

of all oils, is least liable to become rancid.

M. Cyr places olive oil as the highest in order of digestibility of all fatty foods. Even above fresh butter; but to merit this praise it must be thoroughly good, quite clear and transparent and free from rancid odor.

The adulterations of olive oil have excited much public attention. There is little doubt that olive oil is much tampered with, oils from cheaper subjects, such as cottonseed, linseed, cocoanut, peanut, sunflower seed or corn oil being substituted or added in large proportions. Yet, pure olive oil may be obtained from a reliable drug store or at a good grocery store. The imported sweet olive oil was bought in bulk of the druggist for 60 cents a pint; the Lucca oil from Italy at \$1.20 a pint; the superfine Italian salad oil in half gallon cans for 48 cents a pint. The difference in price here indicated suggests the prevalent ignorance as to the value and use of oil as a food. In making these into salad dressing no difference in taste can be detected—all look and work up alike. Some salad dressings have been made of pure cottonseed oil in place of olive oil and there is nothing displeasing in this dressing-although it has the vegetable oily taste; by putting in two tablespoons of pure olive oil with one cup of cottonseed oil it gives it a slight flavor of the olive. If one cannot afford to buy a pure olive oil this is quite a good substitute and it is preferable to a dressing made from

a cheap grade of olive oil, for then one knows exactly what he

is eating.

Salad dressing may be classified as follows: French, Mayonnaise, cream and cooked dressing. Of all salad dressings the French is the most simple. Put in first a teaspoon of salt and a dash of pepper; add four tablespoons of olive oil, and stir with a fork, add one tablespoon of lemon juice, mix well together.

Epicures prefer this dressing to all others, especially on uncooked vegetables. The simple salad with the French dressing is the most refreshing and satisfactory, if one has a heavy dinner served before it. This dressing for a dinner salad should be made at the table, and is most quickly and easily made in a bottle. It may be, however, and usually is made in a dish or bowl.

In London and Paris the French dressing is always used for the uncooked vegetables and the Mayonnaise or cooked dressing for the heavy salads. In America we use the Mayonnaise for all salads, yet it is getting more and more the custom to dress salads as the French and English people do. In making the Mayonnaise dressing, which many find a difficult task, it is believed that less effort will be required if all the ingredients are cold before they are mixed. In order to have them cold before they are mixed, take a large flat bottomed pan, put in an inch of water, chop ice in very fine pieces and put into it. Put olive oil and lemon juice in separate cups and place in iced water; the yolks with salt should be placed in a small mixing bowl which is set in iced water also. After remaining ten minutes in iced water, they are ready to be used. Let the dish in which the yolks and salt are placed remain all the time in the iced water. The usual proportions are: yolks of two eggs, saltspoon of salt, two tablespoons of lemon juice and one cup of olive oil. Stir lightly with a wooden fork the salt and yolks, which should be slightly thick. Now begin to add, drop by drop, a cup of cold salad oil. Stir rapidly and always in the same direction until the mixture is glossy and thick; add the lemon juice by teaspoonfuls. This dressing may be used at once or it may be covered and kept for several days.

Depend upon the salad materials, rather than the dressing, for the flavor. Where the flavor of oil is not liked, or where a large quantity of dressing is needed at little expense—after the Mayonnaise has been made according to directions—stir in one pint of cream, whipped to a stiff froth, to each quart of oil, mix and use at once; or mix the Mayonnaise with an equal quantity of cooked dressing and add whipped cream to taste.

If, by ill luck, the Mayonnaise separates or curdles while being made, stop at once, start another egg in a clean bowl and add your curdled sauce, by degrees, to the new dressing, and the whole will come out good yellow and with the consistency of very thick, rich cream. The curdling or "breaking" of the emulsion can only be due to sudden excess of oil or lemon juice, so that, in re-mixing, moderate the one or the other accordingly. To have good rich, thick dressing the eggs must be fresh, the oil good, and all the ingredients cold before mixing.

For those who do not like the taste of olive oil, the cooked or cream dressing is delicious, using the cream dressing for uncooked vegetables and the cooked dressing for the heavy salads. The cream dressing is made just the same as the Mayonnaise, but instead of using the oil, use thick, sweet cream. This dressing is delicious with cucumber, or any uncooked vegetables, as

it does not hide their flavor as does the olive oil.

The cooked dressing is made with five tablespoons of hot wine vinegar in double boiler, add well beaten yolks of five eggs; stir in hot vinegar and cook until thick; remove from fire, then add five teaspoons of butter; stir until cold, season with salt, pepper and mustard. This may be thinned with whipped cream, if so desired.

It has been said that "Of making books there is no end." The same thing can be truly said of salads. As a salad should appear upon the table every day in the year, it is necessary that a change should be had, and each season of the year should be provided for. The most difficult season is the latter end of the winter, and it may be of use to mention that the dandelion is then a friend in need. If a pot be placed over the plant as it grows, or the leaves tied up like lettuce, or it be transplanted into a frame, it can be bleached and thus lose its bitterness.

Currants used as a Salad.—Ripe currants gathered on stem and well washed make a nice fruit salad. They may be sprinkled with sugar or eaten without, according to taste. Or the currants may be removed from the stem, sprinkle slightly with fine sugar, and set away in a cold place an hour before serving. Any fruit may be served in a similar manner.

Banana Salad.—Take off one section of peeling, take out banana and cut into small cubes; dress with French dressing. Put back into rinds and serve on lettuce leaves. This, indeed, is a delicious salad to serve with a fish or meat course. The Mayonnaise dressing may be used if prepared.

Orange Salad.—Cut into thin slices without peeling, then quarter and dress with cooked dressing or Mayonnaise. For lemon salad, use lemons instead of oranges; or, the mixing of the two makes a very good salad to serve with fish.

The apple appeared before man and it was the means of getting up the greatest revolution the earth has ever known;

nevertheless, it makes a most delicious salad and must not be omitted. Select good tart apples, peel and cut into small cubes, and serve with Mayonnaise or cooked dressing.

Pea Salad.—Take one can of peas, drain water off, use same amount of tart apples as peas. Cut apples same size as peas. Mix with peas and apples one cup of English walnuts. Dress with Mayonnaise.

Waldorf Salad.—Take equal parts of tart apples and celery, cut into small cubes, sprinkle over a tablespoon of lemon juice, mix carefully, dress with Mayonnaise.

Water Melon Salad.—With a tablespoon scoop out the pulp of a ripe melon in cone shaped pieces, arrange them on lettuce leaves and serve with the French or Mayonnaise.

Cucumber Salad.—Peel the cucumbers and slice them several hours before they are to be eaten, sprinkle with salt and put in a cool place. When ready for use drain carefully, pour a little vinegar over them and sprinkle with pepper. This process deprives the cucumber of its crispness but imparts to it a most delicious flavor, and in this state observation teaches us that it can be eaten without compunction by the most unfortunate dyspeptic. Serve with cream dressing.

Tomato Salad.—Peel and slice tomatoes, then put in cool place. Just before dinner place upon lettuce leaves, dress with French dressing or Mayonnaise and serve at once.

Tomato with Celery.—Cut the tops off of nice plump tomatoes, take out all seeds, cut the red pulp of tomato into small cubes. Use as much celery as tomato pulp, mix well together, dress with Mayonnaise, put into tomato cups; place on lettuce leaves and serve.

Bean Salad.—After beans have been well cooked, drain off water. Dress with French or Mayonnaise.

Carrot Salad.—Cut boiled carrots into small cubes, put on lettuce leaves, serve with French dressing.

Sweet Green Peppers.—Cut peppers into halves, take out seeds, parboil; when cool enough, peel and cut into small pieces. Use French dressing. This is splendid with a meat dish.

Cabbage Salad.—This salad is known everywhere, yet many spoil this salad by putting mustard into the salad dressing. Mustard should not be used, as cabbage possesses that flavor or family trait in a sufficient degree. Celery appears to be a perfect harmonious combination with cabbage.

Lettuce Salad.—All green dinner salads, such as lettuce, cress, white mustard, kale, endive, chicory, cos lettuce, celery, and corn salad plant, should be made at the table—or immediately before serving. They should be eaten as soon as they are dressed, for the acid, ice, lemon juice, or wine, vinegar and salt

soon causes the leaves to appear limp and wilted. Serve with French dressing.

It should be remembered that no kind of salad should be

soaked in dressing—use enough, but not too much.

Beet Salad.—Cut boiled beets into thin slices or cubes, place on lettuce leaves, cover with French or Mayonnaise dressing.

Cauliflower Salad.—The cauliflower must not lose its color, so boil slowly to keep perfectly white. When done take it from the water and break it apart in flowerets; when very cold sprinkle over a little chopped parsley, cover with French dressing or Mayonnaise and serve.

Potato Salad.—Potato salad is much better made from the potato while hot. Cut into cubes and dress with Mayonnaise or French. Onion juice and parsley are desirable additions. Chill before serving. Instead of using onion juice the onion extract is much more pleasing, as the volatile oil is mostly taken out so that the undesirable part of the onion is not left on the breath.

Sometimes we mix the vegetable and fruit salads as: Orange with Celery.—After peeling, cut oranges into half inch pieces, cut celery same size, using same amount of each. Serve with

Mayonnaise or cooked dressing.

Garnishing or decorating salads present an opportunity for displaying artistic taste and judgment. The most deliciously blended salad will not be appreciated unless it is attractive in appearance.

No extra rule can be laid down for garnishing; much depends upon the judgment and good taste of the salad maker.

Original ideas are commendable.

Flowers neatly arranged, with alternate tufts of green, are very pretty. Also parsley and slices or quarters of lemons.

A salad should not be patted down and smoothed over—the more nearly it looks as if it had been just made, the more nearly it is ideal.

"It seems highly desirable that one should get as much of his living as possible from the garden and orchard. It is possible to grow hundreds of fruits and vegetables which may be enjoyed by the family in a condition of freshness and perfection quite unknown to the patrons of small town markets. Yet many of the commonest vegetables are frequently neglected and it is but seldom that plants are grown especially for salads. People plead that they have no time and money for such enterprises, but the requirements are not time and money, but study and forethought. If these are given, the orchard and the kitchen garden may become one's chief store of wealth, health and gastronomic satisfaction." (F. A. Waugh.)

No attempt has been made to give a complete catalogue of

salads or salad plants. The discussion is confined to such plants that have been grown on the college grounds—and the salads mentioned are such as we have made, eaten and enjoyed. Thus we feel that we are dealing with matters of practical experience. Are salads practical for the average housewife? Many people, after dining at a table served in a superior style to their own. say to themselves, resignedly, "All this is indeed agreeable and pleasant, but it is quite impossible for us. We have not the material means and appliances to do it. We might as well attempt to grow hot house roses in the open air." And to such people the dinner remains a "souvenir" instead of serving as an example. They clearly make a mistake as to what they may attempt and what they may not. The extra ornamentation may be let alone, but the few good dishes, such as the salad, may be had easily by those who have the courage to will it. So be convinced of this. You have only to study salads. Upon careful thought, it will be found that the difficulty of their execution is rather imaginary than real.

True, there are some salads that are not practical to the average housewife, but, using her common sense, she is able to select those that are simple and easily made, and at the same time those that will be pleasing to the eye and grateful to the taste.

Forethought, practice, and above all, a desire to please, will go a long way towards insuring success.

HOW AND WHEN TO SPRAY.

BY E. E. LITTLE, AMES.

Spraying has been practiced for many years in the eastern states, and is not entirely new to the growers of this state. Five years ago, under the direction of the supervising committee of the horticultural society this work was taken up, and spraying apparatus and materials were distributed to two or three of the horticultural sub-stations, and spraying was practiced for one or two seasons. Wherever the work was carefully and thoroughly done, highly commendable reports were made by the station keepers. This crusade was started mainly for the purpose of introducing spraying methods and bringing it to the attention of the growers throughout the state. It seemed to create a good impression and many of the growers were induced to take up the work, while many others have only just begun and still others are yet to begin. Reports from all parts of the state indicate that where the work has been carefully done, successful results have accompanied the efforts.

During the past two seasons there seems to be a discouraged feeling among some of the growers owing to the excessive amount of rain, which prevented carrying on the work in a proper manner, but growers who sprayed during these two most unfavorable seasons report good results. At all of the experiment stations the fruit sprayed during the past two seasons has been practically free from fungous diseases and insect enemies. This shows that spraying under the most favorable circumstances is profitable and to the practical grower it means either good marketable fruit, or poor inferior fruit, only fit for eider and a cheap market.

The grower must keep in mind that it is essential to spray each year regardless of the weather. This must be done to insure against the orchard enemies, which are always present. It is not likely that we will have two such unfavorable seasons as we have just experienced. It has been fully demonstrated that the trees come through the season in better condition, the foliage being of a healthy appearance when properly sprayed.

Spraying has a tendency to call the attention of the growers to the importance of this and other operations in orchard man-

agement.

In conversation with one of the pioneer of the Iowa Horticultural Society, he expressed himself clearly and forcibly that Iowa horticulturists must give more attention to the care of the orchard and not attempt to do stock raising and the growing of grain at the same time, and they must take up the spraying

proposition if they wish to be successful in fruit growing.

One of the questions that first suggests itself to the grower is how to spray. A person cannot become efficient in spraying without some experience. The first thing he should know is what he should spray for. If the farmer or fruit grower does not know the insects and the fungous diseases that attack his fruit, he can get the information through the literature issued from the United States Department of Agriculture, at Washington, and the State Agricultural Experiment Stations, and articles that are written in newspapers on this subject, or by addressing the Entomologist and Horticulturist at Ames.

The fruit that is of most interest in this section, and will need the most thorough spraying, is the apple and plum. Some insects that attack the apple are the codling moth, canker worm, and the

scales.

Of the fungous diseases that are most serious to the apples is the apple scab, fly-speck fungus and a bacterial disease known as twig blight. The remedy for the apple scab and fly-speck fungus is the common Bordeaux mixture. Where blight occurs the infected twigs must be cut out and removed.

The insects that seem to trouble the plums most are the

plum gouger, plum curculio and the black aphis.

The fungous diseases of the plum that are the most troublesome are the leaf spot or shot-hole fungus, plum scab, and the plum rot or brown rot. Remedy for these diseases is the Bordeaux mixture thoroughly applied just before the buds open and then again after the petals have dropped.

The preparation of the mixtures for combating these insects and diseases require some time and care. The common fungicide

is the Bordeaux Mixture, and is made as follows:

The mixtures for the spraying of insects are of two kinds, one for biting insects, such as the codling moth; and one for sucking insects, such as the scales and louse. The application of the mixture is very important, and can only be well done by using the latest spraying apparatus. I will not have time only to mention the difference apparatus, some of the apparatus that. can be used for different conditions. The knap-sack spray and the auto-spray or sort of compressed air apparatus are small machines, which can be bought very reasonable, and are good for the spraying of small fruits, such as raspberries and straw-The barrel spray is very serviceable in small orchards or for small fruits. Any orchard under ten acres in size could be profitably sprayed by this machine. The barrels hold fifty gallons of the mixture and this quantity will cover about eighty moderately sized apple trees before the leaves open, that are planted twenty feet apart each way or one hundred per acre. When the leaves are partly open you can spray about one-half as many trees with this amount.

One of the growers this year sprayed about four hundred trees in five hours, the trees being ten years old and one hundred trees to the acre, by this machine. For the larger sized orchard the power sprayer should be used. Under favorable conditions about twelve acres of moderate sized apple trees can be sprayed in ten hours.

Whatever apparatus is used, it is very essential that you have sufficient hose, canes and poles with the best nozzles, to apply the mixtures.

The spraying should be done very thoroughly, all parts of the tree being carefully sprayed. The thoroughness in which the work is done will largely depend upon the success. On a windy day it is a good plan to spray on the side of the tree from which the wind is blowing, so that the fine mist will be carried to all parts of the tree. It is essential that the tree should be sprayed on both sides. The spraying should be done each season and preparation should be made for it during the winter months, by ordering the chemicals and getting the apparatus in order. The work should begin early in the season, just before the buds open, just after the petals drop, and there should be two or three applications and more if needed.

Some of the important points to be remembered.

In conclusion I might say that the best spraying apparatus should be purchased and the grower should have in mind the kind that is best suited to his needs. To secure it order catalogues from a number of firms. (1) Spraying should be practiced each season to insure against the enemies of the orchard. (2) Careful spraying oftentimes means success or failure, large profits or small ones. (3) Spraying must be thoroughly done, all parts of the plant must be properly sprayed. (4) During the winter months if the grower has any leisure time, the apparatus and chemicals should be ready for the coming season's work, so there will be no delay at the opening of the (5) In the long winter evenings a grower can get all the recent information on this subject by reading the Horticultural Reports, agricultural papers, bulletins of the State Experiment Station and United States Department of Agriculture. (6) If any other information should be desired on this subject. it would be well to write the Horticultural Department of the State Experiment Station. (7) The mixtures, such as Bordeaux can be made up two or three weeks before using in what is known as a stock solution, using 40 per cent copper sulphate in 4 pounds of lime to 40 gallons of water. This can be diluted at the time of application.

APPLE AND PLUM SCAB.

The apple scab fungus (Fusicladium dendriticum) is easily recognized by the gnarly fruit and the small olive green patches that occur upon the surface of the fruit. The scabiness is due to the growth of corky tissue that is formed as a result of injury to the fruit. This fungus produces its mycelium under-

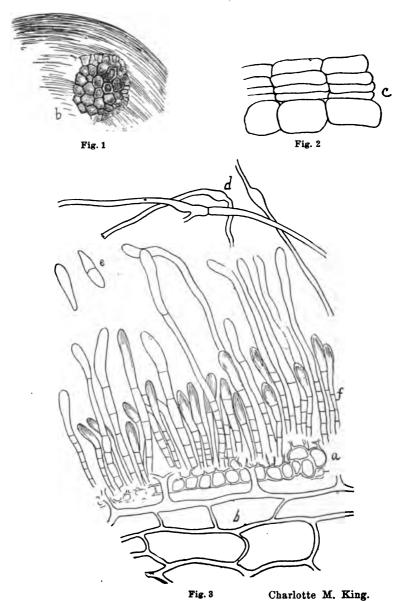


Fig. 1. Surface view of scabby apple, the appearance of cork cells

on the surface.

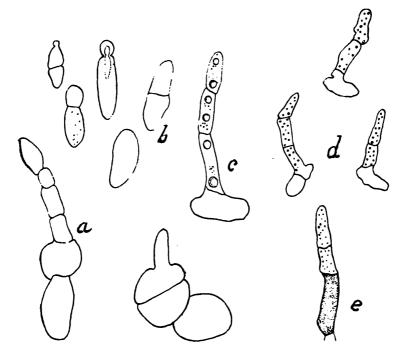
Fig. 2. Cork cells produced as the result of the scab fungus shown at c. Fig. 3. Apple scab (Fusicladium dendritricum) on apple in winter

storage. a. Epidermal cells. f. Short fungus cells that give rise to longer threads, the brown conidiospores that bear the spores which spread the fungus. The velvety appearance on the surface due to the long brown threads. Spores shown at c. The underlying cells of the apple shown at b.

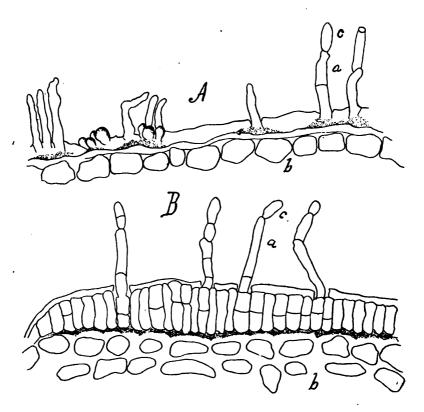
neath the cuticle, where it produces a short layer of cells. These send up erect hyphæ that bear the spores.

Rudolph Aderhold some years ago, in studying the apple scab in Germany, succeeded in finding the winter stage which is known to botanists as *Venturia inæqualis*, Winter, while the summer stage is known as *Fusicladium deudriticum*. The first botanist in this country to have taken the matter up was Dr. Clinton, of Illinois, who confirms the work of Aderhold. (*Bull. 67, Ill. Agr. Exp. Station.*) Apple scab can be largely prevented by treating with Bordeaux mixture.

Another disease to which I have given some attention is plum scab.



Plum scab (Cladosporium carpophilum) on American plum. a. Basal cell and short threads with spore on the end. b. Two celled spore. c. Basal cell, short conidiophore and spore at the end. d. Spore germinating. e. A single conidiophore.



Two sections through spot showing plum scab. The upper, A during autumn when the plums were fresh. The conidiophores at a and c shown. B. A section of the plum scab after the same had been kept for some time in a moist chamber on sand. The elongated basal cells of the fungus shown at l, the cell wall of the epidermis above, the parenchyma cells of the plum below. c. Conidia. a. Conidiophore.

This disease is not unlike apple scab. In its action on plums it is very similar to the peach scab so common upon peaches. It produces upon the surface of the plum a small spot with radiating fungus threads. The growth of the fungus below the cuticle causes a cracking of the tissues and frequently a cracking of the plums themselves, permitting the plum rot to make its way into the tissues and making it worthless for market purposes.

L. H. PAMMEL.

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NO. 6

SOME OF OUR NEGLECTED WILD FLOWERS.

L. H. PAMMEL, AMES.

I have some times thought that we have too long neglected our wild flowers. Not only because of their value for ornamental purposes, but because of their value to man in an economic way. In looking over any of the old works dealing with the use of the plants by the Indians, one is surprised at the large number that they have utilized not only for food, but also for medicinal purposes. That some of these plants might be judi-

ciously cultivated to-day there can be no doubt.

With reference to the ornamental plants there seems to be some excuse for the use of the Old World species. This is especially true of the pioneers. These pioneers not only found the necessity and need of setting aside a small space of ground for the purpose of starting ornamental plants, but they had a particular interest in the species of plants cultivated in their old homes. In the Northwest they used particularly species of the Old World. These plants always brought to them fond recollections of the old homes. As the country became more settled and the population more permanent, a change has been made in our tastes. Still there is much to admire in the old species, but the culture of our New World species has been neglected too long. It is surprising how long some of our ornamental plants have been cultivated. The Dutch botanist, Munting, figures the cockscomb, the four o'clock, and many other Old and New World species were evidently cultivated more than 200 years ago as indicated by the botanical works at that time. The Romans cultivated the White Poppy and De Vries says: "Some varieties are as old as culture itself, and it is generally known that the Romans cultivated the white form of the opium poppy and used the foliage of the red variety of the sugar beet as a vegetable." In many of our gardens there may still be seen such Old World species as the Calendula, Gilli-flower or Stock, the pansy, the common pink, (Dianthus plumarius), the curled mallow, (Malva crispa), the old fashioned Jewel-weed or (Balsamina), the Gas plant, (Dictamus albus,) Burnet, (Poterium sanguisorba,) the old fashioned poppy, (Papaver rhæas), the Yarrow, (Achillea millefolium), the Bachelor's Button, the perennial Phlox and a host of others. Most of the above are native to Europe.

Curiously enough many of our native plants were early introduced into Europe, in fact learned societies, Royalty and the horticultural societies sent explorers to distant parts of America to bring back plants that might be used for gardens. Among these early American explorers we may mention the name of Fraser, who explored the interior of the Carolinas, to whom we owe the introduction of many of the valuable plants of European gardens, besides the work of Michaux, Douglass and many others.

in introducing some of our choice plants.

Of our early wild plants none are more deserving of place than the wild violet of which we have several species. The wild Blue violet (Viola palmata var cucullata), the Birdfoot violet, (V. pedata) and the Prairie violet (V. pedatifida). Crowfoot family there are some beautiful flowers like the Canadian Columbine which is found widely distributed in woods and on rocky hillsides throughout the state of Iowa and widely distributed in North America. The Rocky Mountain Columbine, (Aquilegia cœrulea) is deservedly popular as an ornamental plant but in richness of color that species does not compare with our Canadian Columbine. Of this same order and flowering early in the season are several Larkspurs. The best of these is blue Larkspur of Southern Iowa, the Delphinium tricorne which occasionally runs into shades of red and white. The double flowered European Buttercup, (Ranunculus acris) may be seen in many gardens, but it does not compare in beauty with the white anemone (Anemone pennsylvanica) which is common everywhere in low meadows in Iowa. It blooms freely during the month of May for several weeks. The Meadow Rues have been utilized in Europe and why not utilize our free growing perennial Purple Meadow Rue (Thalictrum purpurascens)? Nothing need be said about our species of Clematis, the common Virgin's bower (Clematis virginiana) is used here and there as a hardy climber in our northern states. In the west they have utilized that beautiful climber with flower much like our Virgin's bower, the (Clematus ligusticifolia). The Dutchman's Breeches (Dicentra cucullaria) is an admirable early blooming plant. The flowers are of very short duration, but for a cool, shady place along side of the house with violets and plants of this character it is admirable.

Of the Cruciferæ or Mustard Family, the western Wall-flower (Erysinmun asperum) occasionally found native in Iowa should be cultivated more extensively than it is. The large bright orange yellow flowers make it a very desirable plant for any garden. In some old fashioned gardens the Rocky Mountain bee

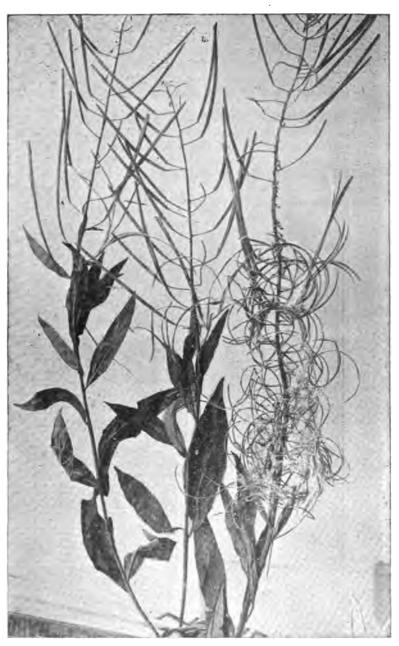
plant (Cleome integrifolia) is cultivated. The vast stretches of this plant on the western plains indicates its great hardiness to all kinds of conditions. It may, however, prove weedy and therefore care should be used in its introduction. An equally pretty species with yellow flowers commonly occurs in some parts of the west. The Cleome lutea. This species is quite as hardy and should find a place in our gardens. The Starry campion (Silene stellata) of the Pink Family is common everywhere in our woods. It is easy to cultivate and might easily be improved under cultivation. Some where I saw the Great St. John's-wort (Hypericum ascyron) eultivated and beautiful it was. Kalm's St. John's-wort (Hypericum kalmianum) common in sandy wet soil of the great lakes is a most desirable woody species.

Here and there the Callirhoes are cultivated. They are vigorous growers, free bloomers and should be used more than they are. The two species that should be cultivated more than they are at present are C. triangulata and C. involucrata; both have purplish flowers. The habits of the two species are somewhat different, the former is nearly erect, the latter trails along the ground. Two of our Rose Mallows are very desirable; the Swamp Rose Mallow (Hibiscus moscheutos) is hardy even in Northern Iowa, and is prettier than the Halbred-leaved Rose Mallow (Hibiscus militaris). This species is native to the alluvial bottoms along the Mississippi as far north as Clinton. In Europe, the Cranesbill is much in use; why not our wild Cranesbill (Geranium maculatum), which is common everywhere in our woods? It blooms in May.

Of the large order Leguminose or Pulse Family there are many valuable plants for decorative purposes. The False Indigos (Baptisia leucophea and B. leucantha) common in many parts of the state. The flowers are large, white or cream color. The plants are somewhat unsightly after flowering, hence should be in an out of the way place. The Blue False Indigo (B. australis) is perhaps hardy in Southern Iowa. A bed of Thermopsis would certainly be a very desirable addition to our ornamental plants. The Thermopsis rhombifolia will prove hardy. In the Rocky Mountains at 6,000 to 7,000 feet there are great. beds of Thermopsis montana. It is certainly a handsome plant with its large yellow flowers. Clovers are common place, but I would suggest the planting of the Running Buffalo Clover (Trifolium stoloniferum), which is found occasionally in open woods and prairies. Then there is the Pomme de Prairie of the Voyageurs (Psoralea esculenta), native to western Iowa. Its dense racemes of blue-purplish flowers are very handsome. Then there are possibilities of this plant under cultivation as an edible plant. The prairie clovers are the most handsome of the whole order.

They have the merit of being long bloomers and coming at a time when they are needed during midsummer. The two species to be recommended are Petolosteum violaceus and P. villossus. I like the Hoary Pea (Tephrosia virginiana), which grows in sandy soil in the eastern part of the state. Why not cultivate the ground plum (Astragalus caryocarpus), which comes early in the season, in May, and blooms freely. There are possibilities of improving the fruit for culinary purposes. They were very much used by early travelers for food. I like the everlasting pea. The Lathyrus venosus which may be found in central Iowa or on the clay hills in northeastern Iowa. It is a weak climber. The flowers are purple and occur in dense racemes. The ground-nut or Wild Bean (Apios tuberosa) has found its way into the catalogues of nurserymen. It should be used more than it is.

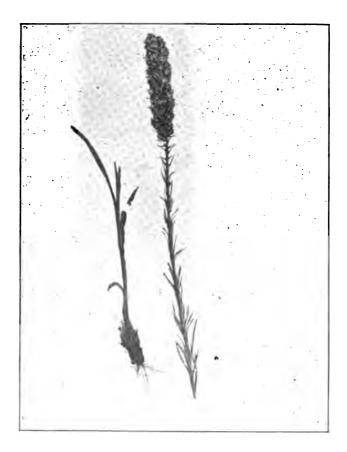
Our native Spiræas have been neglected. There is a wealth of material in the North American species. We have the Steeple bush (Spiræa tomentosa) and the S. douglassi of the Northern Rockies and the Pacific Coast. The latter is so common place in Washington and Oregon that it is not generally thought worth while to cultivate the same, but it is a really beautiful plant. The common Meadow Sweet (Spira salicifolia) is cultivated here and there. The Goat's Beard (Spira aruncus), native in Muscatine county and common southward, is a beautiful plant. The Rocky Mountain Holodiscus discolor is not only delightfully fragrant, but has a pretty panicle of white flowers. Here and there in northeastern Iowa may be seen the Fire-weed (Epilobium angustifolium). The flowers are large purple and handsome. When one sees this plant in all of its glory as I have seen it in the Rocky Mountains, one becomes attached to it. It is not likely to prove troublesome in this state. There are so many of the Evening Primroses one hardly knows what to suggest. The large flowered Evening Primrose (Enothera biennis, var. grandis really a handsome species. The Enothera speciosa with large, white or rose colored flowers is handsome and well known as one of the pretty spring flowers of Kansas and Texas. low growing perennial with large auxiliary flowers known as the Missouri Evening Primrose (Enothera missouriensis) is a hardy and desirable species. From this list I cannot omit the Mentzelia ornata, which is native to northwestern Iowa and westward. The native Cranberry tree (Viburnum opulas). It is, of course, not related to the Cranberry. The species is native to northern and northeastern Iowa and should be cultivated. It is free from insects. The Black haw (Viburnum prunifolium), another species of the same genus, should be cultivated. The fruit is edible and the flowers, though small, occur in dense clusters. Of the Honeysuckles on native species, the Trumpet Honeysuckle (Lonicera



Fire-weed (Epilobium angustifolum.) Common in the burned-over districts of the Rocky Mountains and also in the northern states, especially in Wisconsin and Michigan. It makes its appearance after a fire. A handsome ornamental plant related to the Evening Primrose.

sempervirens) is widely cultivated. A second species, the L. sullivantii, native in eastern Iowa, should be cultivated.

Not many of our native species of the Composite family are cutivated, but many of them should be. During the past summer I had a letter from a lady in Delaware who wanted the seed of the Purple Cone Flower (*Echinacea purpurea*). In her letter she said: "Two travelers—one from Colorado and one from Delaware—passing through your beautiful state have been much struck by a lovely pink daisy which grows by the railroad—pink petals and a deep pink center—in shape like the 'Black-eyed Susan' of the Eastern states. We are most anxious to get a few roots or some seed."



Button Snakeroot or Blazing Star (Liatris pycnostachya.) A common ornamental plant of the prairies. Well adapted for cultivation.

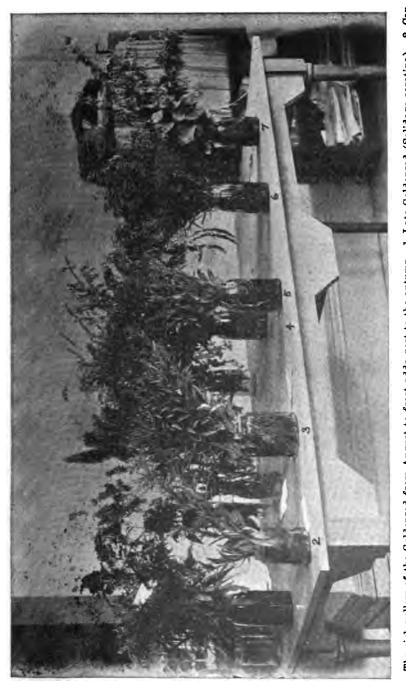
I sent it to her, of course. How many travelers in Iowa have

passed this beautiful plant without notice.

The Blazing Stars (Liatris) of which several species are native to the state, are especially desirable not only because of the long blooming period, but also because of the handsome coloring of the flowers. As to soil, on which they occur the range is from rich soil to the gravelly knolls found in the drift area to the loess soil of western Iowa. Our native asters are seldom cultivated in this country. A friend of mine has a choice collection of the native species of asters, and of all of these he prizes the New England Aster (Aster novæ angliæ) most of all. species is not only a long bloomer, but the handsome ray flowers make it a particularly desirable species. Many of our large flowered asters were cultivated in Europe many years ago. We cultivate in our gardens the China Aster, yet it does not compare in beauty with some of our native species of Aster (another We have species that vary from 1 ft. to 1½ ft. in They are free from disease and not generally subject height. to insect enemies. The Goldenrods are as important from the cultural standpoint as the asters, yet few species are cultivated. Take our large goldenrod, (Solidago speciosa) which is an autumn flowering plant, and what plant lends more beauty to the landscape of an Iowa prairie than this large flowered species of the goldenrod? We have species of this plant from a few inches to several feet high. Let us introduce a few of these goldenrods in our next season's planting. The list of desirable composites might be greatly lengthened, but I will only call attention to a few more desirable species. Among the thistles we have two native species, one of which it seems to me is extremely desirable for cultivation; namely the common Iowa Thistle (Cnicus iowensis). The flowers of this thistle are of a handsome purple color and are abundant during the flowering season. It is not a weed as other members of the genus are. It is biennial. The Pasture Thistle (Cnicus hilli) which produces large heads 1½ inches high with broad, leafy bracts at the base. This low, stout plant is usually cultivated. The flowers are delightfully fragrant. It is not likely to prove troublesome as a weed, as it usually occurs in somewhat sandy or sterile soils. Among the plants related to the thistles, we may mention the Star Thistle (Centaurea). We have long cultivated in North America the Bluebottle (C. cyanus), but this species is far less handsome than the (C. americana) which is common in Texas. Some of the composites have been cultivated for a long time both in Europe and North America. This is especially true of the Gaillardias, the Coreopsis tinctoria, and C. palmata, the Rudbeckia lacinata, in its double form sold as Golden Glow, is fashionable. The .



Much of the beauty of our autumn landscape is due to the g orgeous array of Asters of our prairies and woodland. 1. Sky-blue Aster (Aster (Aster azurens). 2. Arrow-leaved Aster (A. sagittifolius). 3. Smooth Aster (A. lævis). 4. Drummond's Aster (A. strummondil). 5, Western Silvery or Silky Aster (A. sericeus).



The rich yellow of the Goldenrod from August to frost adds zest to the autumn. 1. Late Goldenrod (Solidago serotina). 2. Canada Goldenrod (S. serotina). 3. Showy Goldenrod (S. speciosa). 4. Elm-leaved Goldenrod (S. ulmifolia). 5. Stiff Goldenrod rod (S. rigida). 6. Narrow leaved Goldenrod (S. lanceolata). 7. Broad-leaved Goldenrod (S. latifolum).

Gaillardia pulchella is not more conspicuous than dozens of other plants of this order. The same may be said of the G. palmata. Such plants as G. aristata, the swamp tick seed and the water marigold (Bidens beckii) and Thelesperma (T. gracile) are as pretty and may be used in various ways. One wonders why the Cardinal flower (Lobelia cardinalis), and the Great Lobelia (L. syphilitica) are not used more than they are. What is more handsome than the Cardinal flower? The great fields of the Cardinal flower found along the Mississippi constantly recurs to my mind as the years go by. The small Harebell (Campanula rotundifolia) is well adapted to many places. The pretty delicate blue flowers and the hardiness of the plant make it desirable. The cowslip (Dodecatheon media) which is native from Pennsylvania to Maryland and Eastern Iowa to Georgia and Texas has been almost entirely overlooked by our florists and yet it is one of the prettiest of our flowering plants. During the month of May I was passing along the railroad and saw great bunches of this plant along the right-of-way of the North Western Railroad near Jewell Junction this state. These were as pretty as any plants that I had seen cultivated that sea-Why should not this plant find a place in all of our gar-The Loosestrife (Lysimachia) and Steironema of the dens? same family should be cultivated. Like many other plants they are adapted to a wide range of soil and climate. Of the Milkweed family there are many handsome species, there is nothing I can recommend except Pleurisv Root (A. tuberosa) as most of this family are likely to prove troublesome weeds. Of the Gentian family. I think the Eustoma russellianum, with lavenderpurplish flowers a handsome species. In Texas it is called the Texas Lily, native from Nebraska and Texas, but naturalized in Colorado. This plant with its pretty flowers is certainly adapted to the soil and climate of Iowa. Why not cultivate several species of Gentians? We have several pretty species, yet I do not recollect having seen any of them under cultivation. The Closed Gentian (G. andrewsii), the G. quinqueflora and the G. puberula. The Columbos are striking plants like the Rocky Mountain Frasera speciosa and the F. carolinensis. The former grows in comparatively dry places. I can not call the species particularly handsome, yet it is an interesting plant. The Phloxes are well known, but the only thing valuable in the Phlox line is our North American species which is cultivated extensively both in Europe and America. The Gilias are well under cultivation. The Texas Gilia coronopifolia and the Rocky Mountain Gilia aggregata should find a place in every garden. The Polemonium or Jacob's Ladder has been cultivated. Our native species Polemonium reptans is cultivated here and there, but in



Cardinal Flower (Lobelia cardinalis.) Common in alluvial swamps, especially along the Mississippi River and larger streams of the state, like the Des Moines, the Cedar and the Iowa. Less common in the interior of the state. Related to the Greater Lobelia (Lobelia syphilitica.) Flowers cardinal in color.

the Rocky Mountains there are several species much more handsome than our Eastern North American representatives, like the
P. confertum. Great masses of this occur at timber line. The
handsome blue flowers are conspicuous. Of the Water Leaf
family we have the common Phacelia, both the Rocky Mountain
and some of our native species are desirable graden plants. We
have a long list of handsome species of this genus in the West.
Of the Borage Family the Puccoons (Lithospermum) are valuable. The best of the early flowering species is the long flowered
Puccoons (Lithospermum angustifolium). The Puccoons of the
Indians (L. canescens) is also an early flowering species with
handsome yellow flowers. I like the Bluebell (Mertensia virginica) that is passing from our native flora.

The hardy Ipomæa leptophylla common westward is a stout perennial with very large roots. The root is said some times to weigh 100 pounds. The pink-purple flowers are produced in profusion. It is hardy. Of the Figwort family the Beard tongues are desirable. We have in this genus a large list to pick from. In this state we have two species which are very desirable. The lilac flowers of Pentstemon grandiflorus are very pretty, the species are found on Muscatine Island and on the loess soils of western Iowa. The P. digitalis occurs in southeastern Iowa. It is less handsome than the preceding. In the Rocky Mountain districts are many fine species from altitudes varying from 3000 feet to timber line. I have seen acres of some of the handsome blue flowered species.

The Monkey flower (Minulus) is a genus that we have negleced. Where one has an abundance of flowing water or a spring a western species, the M. Jamesii is very desirable. This is found native in northern states as well. I wish that Culvers Root (Veronica virginica) might be cultivated. The flowers though small occur in a dense racemose spike, four or more inches long. There are some species of the genus Gerardia, like the Purple Gerardia (G. purpurea). The Louseworts, like the Wood Betony (Pedicularis canadensis), an early flowering, native species is desirable. The handsome purple Rocky Mountain species (P. groenlandica) of course will not thrive unless planted in a bog. The verbenas have long been used, but our verbenas like V. stricta are long bloomers.

Of the Mint family. The most desirable are the several species of Horse Mints. For Iowa the Monarda fistulosa is not only one of the prettiest of our wild plants but it will succeed well everywhere in Iowa. The form with bright crimson corollas found in the Rocky Mountains is the most desirable. In the southern part of the state the M. Bradburiana is hardy and should find use. I like the Anise Giant Hysop (Lophanthus



Iron-weed (Veronia fasticulata.) A well known plant throughout the Mississippi valley. Flowers purple, produced in ample corymbose clusters.

anisatus) common in Minnesota and occasionally found on the Iowa-Minnesota line. The flowers, though small, are collected in spikes. For moist situation the False Dragon Head (Physostegia virginiana) is a good plant. The flowers are large and purple. Out on the sandy plain of the Platte River in Colorado, there grows abundantly a member of the Four O'clock family. The Abronia fragans. This perennial produces white, fragrant flowers. I first became acquainted with this beautiful plant in 1895. As our train sped along, during the night the delicate perfume wafted through the open car window. The fragrance is as delicate as the tuberose. The species is reported

from western Iowa to Utah. It is doubtful whether it occurs in Iowa. It is, however, a hardy plant and might well find a place in our gardens. It is a close relative of the common Four O'clock of our gardens. Some of the Rocky Mountain Eriogonums, like E. umbellatum might also find a place in our gardens. Some of the Birthworts, like Aristolochia sipho should be cultivated. Here and there they occur in our gardens. climber is hardy. Of the spurges, the Snow on the Mountain (Euphorbia marginata) has long been cultivated, but the small flowered E. corollata is a prettier plant and a perennial. In a former paper I called attention to the use of our Moccasin flowers (Cypripedium spectabile and C. pubescens.) I want to renew my plea for these very desirable, hardy, native plants. A shady nook is just the place for them. Here and there I have seen the Turk's Cap Lily (Lilium superbum) cultivated. cluster of these makes a gorgeous display. The wild Yellow Lily (L. canadense) is less desirable, although a pretty plant. The lily bulbs should be planted deep. I can not make too strong a plea for the Spanish Dagger (Yucca augustifolia), native to the loess soil of western Iowa. The best way to propagate the The wild Hyacinth (Camassia fraseri). plant is by suckers. native to eastern Iowa with blue flowers is an early summer plant that might well find a place in our gardens. Of the June flowering lilies, none are prettier than the Bunch flower (Melanthium virginicum). The long, ample panicles, with cream colored fragrant flowers are most desirable. It is hardy throughout the eastern part of Iowa where it is native. Few of our grasses are showy, the Eragrostis pectinacea, a perennial, and the Sand grass (Schedonnardus texanus and the E. trichoides) are handsome species that can be used.

I have presented a long list, but many others might be added to give variety. I should like to make in this connection an earnest plea for the preservation of our native plants. Many of them are fast disappearing. Within a few years the large, white flowered Lady Slipper (Cypripedium spectabile) has disappeared from the woods of Ames. The yellow flowered Moccasin Flower (C. pubescens) has become a rare plant. The yellow Habenaria (H. bracteata), once common, has not been seen in eight years. The Marsh Marigold is fast disappearing and so the plants go. Let us all make an earnest plea for our wild plants. Cultivate them when possible and protect them in the

woods.



Bunch-flower (Melanthium Virginicum). Common east and southward. Grows in moist places, producing an open panicle from six to twelve inches long, with pretty cream-white flowers, very fragrant. A very desirable plant for ornamental purposes.

The Editor's Page.

A summary of the reports for June on the condition of the

fruit crop in Iowa is as follows:

Apples, 35 per cent; pears, 10 per cent; American plums, 24 per cent; European plums, 34 per cent; Japanese plums, 29 per cent; cherries, 36 per cent; peaches, 38 per cent; grapes, 69 per cent; red raspberries, 44 per cent; black raspberries, 54 per cent; blackberries, 78 per cent; currants, 59 per cent; gooseberries, 55 per cent; and strawberries, 69 per cent of a full crop.

The average prospect for fruit is 45 per cent of a full crop, or 1 per cent above the prospect in June, 1907, and 35 points

lower than the prospect for June, 1901.

The condition of the apple crop west of the Des Moines river ranges from 10 to 50 per cent, while eastward it is from 10 to 75 per cent.

Pears and plums will be scarce, the bloom having been injured badly by frost. Damsons, Lombards, Gages and Burbanks have set fairly well, but they are a very small part of the plum crop of the state.

The cherry crop will be about double that of last year.

Raspberries will not be more than half of a crop, while blackberries promise to be better than last year.

Grapes and strawberries will yield about the same number of quarts as a year ago.

What a wealth of bloom we have had from the hardy roses this year. The Gem of the Prairies, Queen of the Prairies, Crimson Rambler and Dorothy Perkins are the best pillar roses for this section. We regret that they are only June roses. The Eglantine will always be popular on account of the delicious fragrance of its foliage. Its flowers are single, followed by bright colored heps. The Rugosa roses also have showy seed pods and bright flowers that are attractive in the shrubbery.

Coreopsis lanceolate is now in bloom. What bright yellow flowers they give us, with long stiff stems for filling vases. Few hardy plants give a better show of flowers than the Gaillardia grandiflora, now in bloom. The color combination is orange, crimson and red. Give Gaillardias a dry, sunny place, as they are natives of the western plains.

We have many native species of plants that would develope under garden culture into desirable decorative plants. Dr. Pammel's paper in this issue mentions a number of these, and there are others that would respond to the efforts of the gardener. If more attention is not given to saving the native flora of the state, many species will soon be lost. Most of the woodlands are overrun by stock, and only a little soil remains untouched by the plow along the public highways and railroads, and these under present methods of care will soon be covered by blue grass.

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The recent heavy rains have again taught the lesson of how necessary it is to have an abundance of humus in the soil to prevent it from being washed away at such times. There is nothing that we can use to bind together the particles of soil, in land under cultivation, as the roots of our tame grasses and clovers. Apart from the great value of these as renovators and fertilizers of our land, their mechanical action on the soil is worth all it costs to grow them. The mass of fibrous roots which they produce soon become so interwoven as to hold the soil, not only while they are growing, but for a long time afterwards, as they decay slowly. They not only retain the soil in position, but make it porous so as to absorb water more rapidly and admit air freely.

Years ago, before stock and the plow were introduced on the prairie, the surface of the ground was not washed into gullies as we find it today. Then the ravines were covered with tall grass, reeds and sedges through which the water flowed slowly, except during a freshet, when it would run over them. mud in these sloughs was so soft in many places that it was with difficulty that they could be crossed with team and wagon. It was a common occurrence in those days to stick in the mud. Sometimes the only way to get the wagon out was to fasten a chain or rope to the pole and then attach the other end to the team, or a yoke of oxen on the opposite bank where the ground was firm and thus draw it out. We have drawn cattle and horses out in a similar manner when they stuck fast in such places. Oxen were more successful in getting through muddy places than As soft as the mud was in these sloughs, the water scarcely ever cut a channel through it, the grass roots being sufficient to keep it in place; but as soon as they were enclosed by fences and stock turned in to pasture on them, their tramping killed the grass and then the water soon washed out a channel. Many of these ditches are now from five to ten feet deep and furnish an excellent outlet for tile drains.

In the early days these marshes and sloughs were the feeding and resting places for wild ducks and cranes in their migrations to and from the north, and sometimes a few of these would remain all summer, but now they seldom come this way. crayfish that once dug wells and built towers in the lowlands have gone. The bittern, or stake driver (Botaurus lentinginosus), that would sit for hours in silence watching for a luckless crayfish to come within reach of its swift-descending beak, has departed from the sedgey shallows, and the wild buttercups that grew there have disappeared. They are all gone because the local conditions have changed from the partial draining of the water courses. But these are not all the changes that have occurred in the last fifty years. Then the only timber found in the country was along the river bluffs. Now groves are scattered everywhere, while much of the native timber has been cleared away.

When our orchards and groves began to decay the golden winged flicker (Colaptes auratus) found a congenial place among them to build its nest, and is now quite common everywhere. Whether it is a believer in the crescent or not, it carries one on nape and breast. The red-head (Melanerpes erythrocephalus) also finds in our groves an abiding place and screams out its quir-r-t with the same freedom as in its native forest. These birds feed principally upon insects and should receive encouragement to continue with us—though their presence indicates dead wood somewhere.

Make a note of how busy the blackbirds and robins are in gathering slugs from the lawn and field to feed their young, then let not your wrath be kindled against them later on when cherries and raspberries are ripe if they take a few of them. Remember they have earned something from you for catching bugs and worms. The Grackle is very industrious all through corn plowing. They follow the plow closely and examine the freshly turned soil carefully for dainty morsels. In the fall they eat some grain and corn, but not in such quantities as to damage the crop. They are not charming singers, but can make quite a noise when in large flocks.

The click of the mower as it turns at the corner or goes muttering through the tangled grass may not evoke such poetic emotions in the mind of the idle spectator as the rhythmical beat of the whetstone upon the scythe before another swath is cut, but I am sure its use is a great saving of brawn. To make hay is quite easy, with all the labor-saving devices that have been introduced recently, as compared with the time when it was all done by manual labor. The more machinery used on the farm the greater the skill required to operate it. The modern mower needs attention or it will soon get out of order, and repairs are expensive, as there is no competition on them. It seems impossible for some men to use a mower for any length of time without breaking the knife, getting a hot box, losing a bolt or wearing out some part where there is considerable friction; while others will use it with scarcely any break or wearing out of parts until the whole machine is worn out. The difference is simply a matter of care. Attention to small things, oiling at stated intervals, tightening loose nuts and operating the machine with care; eyes and ears open and alert to detect any obstruction in the way or sound that is not in accord with the perfect play of the machinery.

We should give attention to our work while at it, but that does not consume all of the time. We can stop at the corner and see what is going on about us and listen to the bird songs; that is part of the pleasures of country life. There on the swath in front of us is a meadow lark. See how erect it stands, with a black spot on its large yellow breast. It is the most independent bird in the meadows. It cares little what happens, for it has already decided on what it intends to do. It is too busy now to give much attention to its voice, occasionally flirting the white feathers in its tail and uttering a note as it goes on its way gathering worms. There on the right is a Geomtrida measuring the cut grass. See how it loops up! Twenty spans is the length thereof as the worm measures it. Now it stands up and swavs back and forth from side to side to see which way to go. Alas, poor worm! A black-throated bunting swoops down and carries it off to feed her squabs. Dickcissel is not a sweet singer, but keeps at it through the noon hour. "Chip-chip-chee-chee" is its simple ditty. You hear it everywhere in the meadow during the hay harvest. How those purple martins skim along over the grass, snapping up insects as they go. They are the real nimrods of the air and take their game on the wing. How swiftly they fly and how suddenly they change their course when they see an insect they want. Their black wings glisten in the sunlight like burnished steel. They belong to the swallow family and build their nests in hollow trees, in boxes put up for them or between the lining of buildings where there is a hole large enough for them to get through.

There are tragedies as well as comedies among the tenants of our farms and gardens. Not long since while walking through

the pasture lot I heard a noise as if something was in distress. Turning aside to see what it was, I observed a striped squirrel running with its tail bushed up, and crying at the top of its voice. A few yards behind was a weasel in pursuit. The squirrel disappeared in its burrow, followed by the weasel. It soon came out at another exit with the enemy only a few feet behind, and again sought safety in a hole near by, but the weasel followed it in, its cries soon ceased and as neither came out again it is more than probable that the blood-thirsty pursuer dined upon its victim.

HOW TO CONSTRUCT AND OPERATE A HOME CANNING PLANT.

FLOYD BRALLIAR, STUART.

In order to intelligently answer the question implied in the title of this paper, we must know for what purpose the plant is to be used. If we mean simply a canning plant large enough to furnish an abundance of wholesome canned fruit and vegetables for the home table, I should answer it one way; if we desire merely to market our surplus fruits in a sure and profitable manner, I would answer in a different way; and should we desire to make a regular business of growing certain crops and thus furnish our children profitable employment by producing a fancy article of commerce, my answer would be different still. I shall discuss each of these cases separatly.

First, the home canner for home convenience alone: is it needed? From my experience and experiments, I believe such an appartus to be as long a step toward the comfort and luxury of our rural tables, as was the discoverey of preserving common fruit and the invention of the Mason fruit jar. It enables the housewife to can peas, green beans, corn, asparagus, pumpkins, etc., of a quality as much superior to the factory-canned product as the delicious homemade apple butter surpasses the strong, dyspepsia-producing libel on the fair name of apple butter that is sent out from some of the fruit vinegar factories and the preserve factories of our land. The farmer can raise the product and can it when it is at its best, a thing impossible in a commercial factory. For instance, the children can gather the pods of peas when they are at their best, whereas the factory must wait for the last ones to be ready, then mow the field with a mower, and hull them by machinery and assort them as best they can by large screens, and can them; some half developed, some in good condition, and some so ripe and hard no one would think of using them under other circumstances.

In vegetable canning there are certain conditions necessary,

and certain facts to be recognized before success can come, and these are somewhat different from those in fruit canning. out them one must have the same experience as a good southern lady I met on a trip not long since. It was in a Georgia district where peaches grow to perfection, but the natives know more how to preserve them than they known how to waste, so a lady friend suggested canning them. The lady said it was of no use, that she had tried it several times, and that whatever northern peaches would do, Georgia peaches would not keep in cans. friend persisted and finally offered to teach her how and assist her in the work. Accordingly, the jars were purchased, and the fruit canned, a part for my friend and three dozen two-quart jars for the native lady. Three weeks later my friend met the lady and asked how the peaches were keeping. "Just as I said. they are all spoiled," she said. My friend said her own were keeping nicely, whereupon the lady rejoined, "Mine seemed to be keeping nicely, so at the end of two weeks I opened every can and tasted them." They all tasted fine, and she did not understand how they had all spoiled.

In fruit canning, we contend against the fermentation germ largely, which is destroyed by a temperature a little below 212 degress F., so that if we cook long enough to bring every part to

the boiling point and can hot, we are reasonably safe.

Vegetables are spoiled by a different class of germs, which require a temperature considerably above the boiling point to destroy them. This provided, and they will keep as readily as fruits. Accordingly an apparatus must be provided where such heat can be secured. The regular canning plants call such a · vessel a retort, and for convenience I will use the same expression. A cheap and serviceable retort for family use may be made from a large, extra heavy wash boiler, by simply selecting one whose lid fits closely, and having a tinner rivet and solder a good spring catch to each end, so placed that the catch will fit over the rim of the boiler. For safety the catch should be of such strength that a pressure of say fifteen pounds on the inside will cause it to loosen and slip off the rim. This precaution will seldom be necessary, however, as a dangerous temperature will scarcely be reached on a common stove. Wherever it can be done, it is well to have a thermometer, such as is used in ranges, placed in the lid. A good grade of galvanized iron boiler, or an anti-rust boiler is the kind to use. Such an apparatus on an ordinary stove will serve the needs of the ordinary family nicely. In it one can cook twenty-four three pound cans at once, which is quite as many as will be packed by an ordinary housewife in one day, because of the labor of preparing the vegetables.

A false bottom made of wooden slats on which the lower tier of cans are set, and a pair of lifters for removing the cans when cooked, a small hand furnace and two soldering coppers complete this outfit.

A similar plant complete, can be purchased from any one of a number of concerns for from five to ten dollars. The capacity is about two hundred three-pound, and three hundred twopound cans per day. Plants of either of the other sizes mentioned in my preface may be contructed on the plan of the old single pan sorghum molasses boiler. Where it is desirable to can vegetables as well as fruits, a retort must be made, and so the expense increased quite materially. In this case, the pan (of any desired length, width and depth) should be constructed of good heavy sheet iron, or even boiler iron, would be more desirable, and the lid may be held in place by levers fastened to one end of the apparatus, and caught under hooks at the other. A good thermometer should by all means be placed in the cover of such a pan. Should a man who contemplates contructing a canner. possess an engine so he can use steam in cooking, an old upright boiler makes a most excellent retort. However, as a thoroughly practical outfit complete with a capacity of from one thousand to two thousand cans per day can be purchased for from thirty to fifty dollars from reliable manufacturers who make them a specialty, where a retort is needed, it is generally best to buy one ready made.

Now I come to the other class of canning, and the kind that will most interest the Iowa horticulturists, the cheaply constructed plant that will enable a fruit grower to can his perishable fruits when there is a glut on the market, and he would otherwise lose his profits. As the best way of explaining this, I will tell how our own plant was constructed, which enabled us to can several hundred bushels of tomatoes when the price became too low two years ago last summer. We had our local tinner make us a galvanized iron pan seven feet ten inches, by two feet two inches, by eight inches. We next laid up a brick and mortar furnace eighteen inches high, about two inches wider than the pan, and of the length of the pan with an extension just long enough to receive a sheetiron hood leading to stovepipe two joints long. A sheet-iron door closed the mouth of the furnace, all but enough to secure a good draught. The fuel was old grubs, stumps, and waste wood. The pan was supported over the furnace by three pieces of strap iron that happened to be convenient and cost nothing, while a wooden lid prevented too great an escape of heat. This plant cost ten dollars complete, besides our own labor in constructing the furnace, and had a

capacity of one thousand three-pound cans per day, under favorable circumstances.

I now come to the second part of my paper, the manipulating. of the plant, or "how to can."

First, as to the kind of cans, caps, solder, flux, etc., and just here let me say that I am not discussing canning in glass at allin this paper. Buy only the large-hole cans in either the twopound or three-pound cans, as the ease of filling many times, over-balances the slight difference in the amount of solder used. Be sure to order solder-hemmed lids. I did not do this on an order of five thousand cans, and I do not wish anyone else to make the same mistake. After the fruit or vegetable is prepared, fill the can evenly full of the raw product. This we accomplish by means of a wooden pestle on a lever with one end fastened to, the wall. A tack in the pestle insures regularity of filling. We. press the fruit in solidly, but not enough to crush such fruits as tomatoes and apples too much. Just here let me say "Beware of. too much juice. Better have some of it for bottling and have a higher grade product."

Next the top of the can is thoroughly cleansed with a brush or cloth, flux placed on with swab, and the cap laid carefully. in place. The cans are then set in trays and passed on to the "capper." With a proper sized round capping-steel he rapidly solders on the cap, leaving the opening in the center open. The trays are now set in boiling water up to one-fourth inch of the. top for a few minutes, to drive out the excessive air. From here. they go to the tipper where the top is brushed with cold water to slightly lower the temperature, and to make sure it is cleansed. Flux should be at the same time applied. With a good tippingcopper, the operator now closes the center hole, and should he discover any defect in the rim solder, remedies it. Next, submerge the can in boiling water to discover possible leaks. done, all is ready for cooking. The length of time required to properly cook, varies from three to five minutes, after actually reaching the boiling point for strawberries; ten minutes for apples and peaches; from one hour to one hour and a half, cooking in a closed resort from 230 degrees F. to 240 degrees F., for corn, peas and pumpkin.

Now the question arises as to what fruits will can. Good smooth tomatoes run from fourteen to twenty-three pound cans per bushel. One bushel of such berries as blackberries will can from four to five dozen two-pound cans. Apples yield near. eighteen three-pound cans. Peaches can about twenty three-

pound cans.

OUR BIRDS.

WM. LANGHAM, CEDAR RAPIDS.

The economic value of birds to agriculture is not fully understood or duly appreciated. Somehow the public at large is slow to realize that the feathered race is its greatest friend and benefactor. Of the three hundred species, more or less, of birds in Large with the street hundred species, more or less, of birds

in Iowa, probably not a dozen are really injurious.

The department of agriculture at Washington, through the division of ornithology, has been making extensive observations and examinations as to the habits and food of birds, and the results are actually surprising. Many species, popularly supposed to be the very incarnation of evil, are proven to have many good traits. A few species may be to some extent injurious at certain seasons, but for the remainder of the year, in fact the greater part of it are beneficial. This is in conspicuous contradiction to some people I know, who are over pious Sunday. but the deuce is to pay the rest of the week. Even the owls and hawks and crows, even the worst one of them, is not nearly so black as painted, while the great majority are put on the list of beneficial birds. Almost all birds eat insects. Indeed, many species are exclusively insectiferous. Among these highly beneficial birds are the wrens, five species; the swallows, six species; the vireos, seven species; the flycatchers, ten species, and the warblers, thirty-six species. Even the seed and fruit-eating species are also largely insectiferous. With all the evidence in an impartial and intelligent jury would certainly award first place to our birds as benefactors to agriculture. If I had the power I would compel instruction on the economic value of birds in every schoolroom throughout the land. It is true that at times the horticulturist may feel that the robin and catbird and tanager and red-headed woodpecker and others are taking more than their just share, yet, after all, if the books were balanced I believe we would be debtors, and largely so, to these feathered beauties. From the standpoint of a fruit grower, there may be an exception in case of the waxwing, Ampelis cedrorum. waxwing has no more respect for your finest cherry than he has for a Russian mulberry. As cherry time approaches they (the waxwings) put on their best clothes, adjourn housekeeping to some future time, flock together and go on a jaunting tour, ostensibly. I suppose, to look at the country and have a good time, but in reality to spy out the cherry orchards of the land. Many a time in spring and autumn when the ducks and geese were migrating, have I watched a flock alight in some pond or lake for food and rest. Invariably they would circle and wheel around and around in the most graceful curves imaginable to assure themselves that it was really a safe and desirable place. Do you think the waxwings emulate this caution? Not they. They come down from the upper depths—this jaunting troop as straight as an arrow from the bow. Before you can get your breath and recover from your astonishment each one of these revelers has seized upon the ripest and sweetest cherry in sight. And then to cap the climax they have an exasperating habit of biting and spoiling ten times as many as they eat. They have come to stay, and one of two things will come to pass. They will remain till the last cherry is gone or you will have to exterminate the flock. The waxwing is to the cherry grower what the wayward and incorrigible youth is to society. Possibly in neither case has the correct solution been found. This bird is extremely handsome, and barring cherry time, is no doubt a well behaved and useful citizen. I once found a pair nesting late in August. They had confidingly chosen an apple tree close to the house in which to build, and although their depredations were still fresh in memory. I had not the heart to disturb the demure little shoplifters.

Putting aside the sordid question of dollars and cents, let us look at a more noble and agreeable phase of the subject-the esthetic value of birds. It seems to me that every person. and especially every horticulturist, ought to be something of an ornithologist. No one should pass through life without becoming acquainted with the dearest and most interesting of all dumb friends, the birds. Birds are the poetry of animated nature. Their volubility and sweetness of song, their variety and brilliancy of plumage, and their grace and beauty of motion all combine in appealing to man's higher and better nature. Have you ever listened to the thrushes, and the orioles, and grosbeaks, and chats, and warblers in the spring at mating time? Their joyous notes are the very personification of perfect happiness. Even the great flocks of blackbirds on their periodical journey north, after they have feasted on your noxious seeds, and even more noxious grubs and insects, will give you a concert that will stir and thrill the heart more deeply than ever strain or melody rendered by Gilmore or Sousa. And the first song of the blue bird. of heaven-born hues, and of robin redbreast, almost before the great snowdrifts have melted away. Their ecstatic notes come to us like some message from the invisible world, bidding new joys, new hopes and inspirations to arise. The mere presence of birds gives to us unalloyed pleasure and happiness. beauty and variety of form and coloration adds an indescribable fascination to the landscape. Without them the greatest charm of prairie or forest would be wanting. Without them the gloom and stillness of death would reign there.

I always have an especially warm feeling for those birds that

remain with us through the long and dreary days of winter. The . junco and other native sparrows, the chickadee, the nuthatch, the woodpecker (Picus villosus), and the jays, all contribute to keep in memory the sunshine and glories of the summer. Even the pugnacious little English sparrow in winter commands my admiration. And there is the jay, the much-maligned jay! He is a whole circus, clown and all, by himself. If, with his dainty white and blue, he had red instead of black bars on wings and tail, he would become our national bird and be enrolled among the saints. A friend of mine delights to tell how upon a time -he saw a jay making the flight of its life down a little glade in the woods. A hawk with murder in its heart and lightning on its wing was in hot pursuit. Almost at every wingbeat the jay was screaming jesu! jesu! and but for the proximity of a friendly brushheap into which it darted its moments were numbered. The hawk, baffled and defeated, was out of sight in a When the coast was clear and all danger past the jay hopped out to the topmost twig and cheerily and saucily said, "Too slick! Too slick! Too slick!"

What signifies the few berries, or the little fruit or grain our birds may eat when compared with their utility, their beauty, -and inspiring presence? Nature out of her bounteous wealth has intended a sufficient portion for them. If we antagonize nature, she will retaliate. The greatest enemy of the birds is man himself. I would rather have a whole family of hawks, or a thicket of owls on the farm than some lazy slouch with an old shot-gun, or an idle, worthless boy with a B. B. rifle. Every form of feathered life is their legitimate prey. They are totally devoid of shame, judgment or conscience. Last summer a fruit dealer in Cedar Rapids came up to see what the prospect for fruit was, and brought along one of his clerks. This clerk had with him his 22 rifle—a magnificent weapon. It carried one shell in the chamber and thirty-one more in the magazine, thus making the owner a veritable walking arsenal, and he was just spoiling to shoot something. Thinks I, he'll do to watch. Soon along came a house wren with a worm in its bill, which it was carrying to its young. Up went his rifle. Hold! Hold! I said. That little wren, my dear sir, has for five years come back to us each spring and built its nest, and reared its young, in a pigeon hole in our tool chest, right in the shop where we make crates and boxes. Why, it's one of the family. Just then a flycatcher shot out from an adjacent tree where he had been patiently watching, and captured a vicious looking bug or insect that was passing. Up went his rifle again. Don't, I said, don't! That flycatcher has been doing that all summer, and I want him and all his relations to keep at it. And I was compelled to point out to him a knot-hole in a board on the corn crib, whereon he could exhibit his skill as a marksman. There is another class of persons prowling around the country who call themselves taxidermists and collectors. If there are degrees in infamy this latter class deserve the palm. In the name of science these miscreants are killing our birds for their skins and robbing their nests of their eggs to supply the needs of colleges and other institutions, they allege; but in reality investigation will show that nineteentwentieths of the proceeds of their deeds of blood and robbery go into the shops for ignoble gain. Oh fashion! thy votaries must some day answer for many of their sins.

In my opinion (at least it is my opinion sometimes) society would be none the worse off, and agriculture largely the gainer, if every one of these scoundrels was promptly lynched. One bird in the flesh is worth a room full of stuffed ones, both to the present and to future generations.

Science must not be too exacting. Of course museums and cabinets of natural history seem to be necessary, but only those under government license should supply them with specimens.

Today with us it is my belief that there is not more than 50 per cent as many birds as there were twenty years ago. Bird life must be protected. If the balance of nature in this respect is destroyed, we must suffer in consequence. I warn you that until the people arise in their might, and a most stringent and drastic law is enacted and rigorously enforced against the whole class of bird assassins and robbers of their nests, our birds will continue to decrease, and our insect enemies to increase.

NOTES ON CHERRIES AND PLUMS.

Of the cherries on my place the Emperor, two trees, one root grafted which I bought, the other top grafted, on low prairie gumbo soil are bearing very full. Early Richmond, several older trees on drier black soil, do not bear one-quarter as much fruit this season as the Emperor. These Richmonds are sprouts with roots and tops all the same kind. No. 23 Orel has fruit much like Early Richmond and is more productive; but not as much so as the Emperor this season. Lutovka never bears, and Baldwin on drier soil is almost barren. Late Morello has a few small cherries.

Of my plums, Harrison's Peach and Bixby are bearing pretty full, American Eagle and Klondike not so full. Wyant has a few plums, last year not any, but three and four years ago my Wyants bore very full, the fruit was large and even in size and sold for \$1.50 a bushel on the trees.

SILAS G. Goss, Lehigh, June, 10, '08.

VANILLA GRASS.

The following letter from Mr. C. E. Allen of Fostoria, Iowa,

may be of interest to the readers of Horticulture:

"Please find enclosed a sample of grass which I find on my farm in four or five different places. It has been there about three years since I first noticed it. It is very early as it is heading out now. It does not root very deep in the ground, but is very bad about getting spread over the field with the harrow. It is on rather wet, level land and seems to stand all kinds of cultivation."

The specimen sent is the Vanilla Grass (Hierochloe borealis), which is a well known, common plant in the north and in parts of this state. It is common in low marshy grounds nearly as far south as Grinnell. The sweet odor of the grass is due to cumarin. It is very seldom that this grass is weedy.

The root stocks of the grass were used by the Indians, especially the Ojibways and Penobscots and others, for making

baskets.

The Vanilla Grass is a slender, sweet-scented, stoloniferous perennial, one to two feet high, with short culm leaves, and brownish open panicles, branches in pairs. The odor is so characteristic that the plant needs no description. It smells like the sweet clover, and as there is only one other grass that is like it, it cannot be mistaken. This grass is related to the European vanilla grass.

L. H. Pammel.

THE YUCCA.

The Yucca will soon be in bloom. The tall spikes—four to seven feet—look like ghosts at night. The flowers are greenish white at first, then creamy white, and last a long time. A group of half dozen or more plants look well on the lawn or among shrubbery. The old plant dies after blooming, but new ones soon develope at the crown, though they will not be large enough to bloom for several years. To have a succession of bloom year after year there should be a group of these plants in the border or shrubbery.

Glauca, or augustiflora as it is usually called, is native to the western part of the state.

Filamentosa, of which there are several garden varietics, is more generally planted for decorative purposes. It is native of North Carolina to Florida, though quite hardy much further north. The illustration shows a fine plant on Eugene Secor's place at Forest City.

Yuccas are desert plants and should have a dry location.



COMMUNING WITH NATURE.

CARE OF HEATING PLANT WHEN NOT IN USE.

G. H. BANCROFT, CEDAR FALLS.

I have been assigned a topic in regard as to care of steam boilers in summer. Perhaps the best I can say would be to tell how we care for our own. When we quit firing generally in May or first of June, the flues are thoroughly blown and then scraped and then blown again. The entire boiler is cleaned on the outside, back and front and thoroughly painted with asphalt paint or oil. All the flues are swabed out with oily rags. All ashes are removed from fire box and soot from rear of boilers. The doors are taken out or opened and all painted inside and out. The door and dampers are left wide open so that a thorough circulation of air is maintained. The inside of the boilers are washed out and manholes are taken out both top and end. This also gives a circulation of air inside of boilers. Of course our boilers are setting on top of ground in a large high stone shed forty feet square so that we have a good circulation of air and there is no dampness or sweating in the boilers. Our automatic pump used for returning condensed steam to the boilers is dismantled and everything is left wide open so that any dampness that may accumulate drains off from the pump and pipe.

When we used hot water we kept boilers full of water; and although on top of ground in open sheds, they sweat considerably, consequently flues soon rusted out. With a hot water boiler the way most of them are built it is almost an impossibility to prevent this sweating, but think it preferable to keep them full of water during summer. A damp boiler shed is a yearly expense in repairs on boiler, and in a few years your boilers are rusted out so they are unsafe and the cost of repairs will soon pay for a good airy boiler room and cost of a trap or pump for returning condensed steam to boiler.

BEDDING PLANTS-THEIR USE AND ABUSE.

J. T. D. FULMER, DES MOINES.

I shall only speak of summer bedding and carpet bedding, since they are the two most in use in this section of the country.

First, summer bedding, where we use cannas, geraniums, coleus, verbenas, ageratum, salvia, vincas, alyssum, petunias, heliotrope, grasses, alternantheras, artemisia, begonias, dahlias, etc. I should plant but one variety of geranium in a bed, bordering the plants with some of the low growing plants, as artemisia or Madam Solleroi. Again, never use but one color of cannas in a

bed and these should be bordered with some tall growing plant, as grass or salvia. As for coleus, they may be planted two, three or four varieties in a bed, provided each variety is placed in its own division of the bed. Coleus should be planted where they may be exposed to the full sunshine, as the colors are much enhanced thereby.

For dahlias, I prefer mixed colors in the same bed for the dahlia and chrysanthemum flowers blend well even though seveveral shades are used together. Stake dahlia plants up, and do not permit many side shoots to grow as this is a detriment to

bloom.

Artemisia is considered one of the best plants, used either as a border for geraniums or in carpet bedding. As to begonias, the only fibrous-rooted varieties largely used for bedding are those of the Semperflorens type, of which Erfordii and Vernon are the best. Verbenas should be grown by themselves because they demand much room on account of their trailing habits. Propagation by cutting must be relied on if we would keep the choicest varieties true to type.

In the matter of carpet-bedding, I am well aware there is a strong feeling against it by the landscape man; yet, in spite of all objections, the public are lovers of it, provided of course, it is well done. That it may be seen to the best advantage, it should be placed in sunken areas, as we find it in Mitchell Park, Milwaukee, Washington Park, Chicago and Fairmount Park,

Philadelphia.

Plants best adapted for use in carpet bedding are Coleus, Alternanthera, Stevia varigata, Artemisia, Echeveria, Santolina and Sedum. All these, except Echeveria will stand pinching which keeps them at a desired height. When carpet beds are well done, they are very attractive, and since they require technical skill and time they certainly deserve appreciation.

I now turn to the last, and to me the most important part of my paper—the abuse of bedding plants. This may be done, first, by placing two or more colors of geraniums in a bed, as red and pink, bordering it with coleus, which is allowed to grow taller than the geraniums. Or, it may be a bed of cannas of two, three or four varieties, bordered with geraniums and possibly ageratum for an outer border.

Again, it may be a large, solid bed of salvia, without any border at all to break the monotony. Still again, it may be a bed of six or eight colors of coleus mixed like "Grandmother's crazy patch quilt."

These are some of the abuses we often see, to say nothing of that abuse which allows weeds and grass to rage rampant,

smothering the flowers out.

Last there is another abuse of bedding plants, the watering:

can. How often it is used with bad effect, since it merely sprinkles the ground, thus encouraging the roots to come to the surface where they are soon destroyed by the hot sun. Whereas, if the ground is thoroughly watered and allowed to dry on top, the roots will go downward in search of moisture and not be susceptible to any hot, dry spell.

THE CURRANT WORM.

We have received a number of inquiries about the currant worm, (Nematus ribesii) recently and possibly a few words about it may be of interest at this time. This insect is a native of Europe and was introduced to this country about fifty years ago. It is much more destructive to the currant industry than the native saw-fly (Pristiphora grossulariæ), which seldom ever appears in such numbers as to defoliate the plants. The imported worm is produced from eggs laid by a yellowish fly, about the size of a common house-fly. The eggs are deposited in rows along the larger veins on the under side of the leaf and hatch in about ten days. The worms at first are white, then change to green, then black spots appear.

The worms are gross feeders and will strip a bush of foliage in a few days. At maturity the worms take on a yellowish tinge. When full grown they are about three-fourths of an inch in length; then seeks a place to form their cocoons, either on the surface of the ground or a little below it, where the transformation takes place. The first brood appears in June; the second in

July or August.

The larvæ of the saw-fly is easily killed. There is little excuse for the gardener who allows these worms to defoliate his bushes. An ounce of hellebore in a pailful of water will soon make short work of the worms, or any of the arsenical sprays will kill them. All that is necessary it to be alert and apply a remedy as soon as worms appear.

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JULY 1908

IOWA HORTICULTURE

MONTHLY BULLETIN

OF

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IOWA HORTICULTURE

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IOWA HORTICULTURE

VOL. 1 JULY, 1908 NO. 7

HARDY HERBACEOUS PLANTS.

We have long felt the need of a catalogue of hardy herbaceous plants adapted to the climate and soils of Iowa. Most of the literature on gardening has been written from the experience of eastern or European gardeners; their methods of culture, and the varieties recommended are not always adapted to the condition we have here. Not long since we sent a list of 120 species to the gardeners of the state for a report of their experience with them, and it is from their replies to this list that has lead to the following preliminary list of herbaceous plants for the state, and we hope it may eventually, after criticism and revision, prove helpful to amateurs and gardeners in selecting material for decorative planting. No one will care to plant all the varieties named, nor would all be adapted to any one locality. Because a plant fails to respond to the care given to it by one gardener it should not be taken as conclusive proof that it is not adapted to that locality, for the failure may have resulted from improper treatment, an excess or lack of moisture in the soil, too much shade, or not enough sunlight during part of the day. Little things like these often determine the success or failure of a plant in any locality.

Soil often makes quite a difference in the behavior of plants; some are more exacting in their demands than others, less sensitive to the physical condition, or its chemical constituents. This observation is well illustrated in the behavior of the native lobelias. The large blue lobelia, which is widely distributed over the state, is usually reported tender under cultivation. Both the blue and cardinal lobelias are native plants, found in sloughs and borders of ponds, the blue one growing in the wettest part of the slough, sometimes where the ground is covered with water for many days at a time, while the cardinal variety grows near the margin on drier soil. When these plants are taken to the garden they fail, not because of any change in the amount of cold to which they are exposed, but from lack of moisture in the cultivated ground. Possibly, too, they suffer from freezing in the drier soil, or from an insufficient supply of

water during August and September to mature the plant sufficiently to withstand a rigorous winter.

Another plant that was abundant on the prairie has not always proven satisfactory under cultivation. I refer to the Meadow Lily. This plant has often done better when planted in grass land where the soil has not been disturbed, than in beds that have been cultivated. I think it is more a matter of the physical condition of the soil than from any other cause. Possibly from an excessive amount of humus, which lilies usually resent, unless well decomposed.

I had a singular experience with a White Adder's Tongue. which I found growing on the bank of a creek. It was in bloom when discovered, and was taken up and planted in the garden a few days later. It has been growing there for more than twenty years, but never in all that time did it ever bloom in its new location. Year after year it has sent up leaves to let me know it was still there and that was all it would do.

I cite these instances to show the necessity of giving more attention to soil conditions and environment when determining a

question of hardiness of a plant in any locality.

Hardiness as applied to plants is local in its application. It does not fix a definite degree of heat or cold, or the amount of moisture or drought a plant can resist without injury to its vital functions. A plant may be hardy in the locality, and yet not thrive under the treatment it has received. Perhaps it is one which requires a cool, moist situation and you have given it a dry, warm location, or the reverse may be true; the plant should have had a dry, warm place and you planted it in a moist, shady spot and it does poorly under this treatment, you then conclude it is not hardy, when it was the treatment given that was the cause of failure.

The rapidly increasing urban population of the state makes it necessary in discussing cultural directions to consider not only the surface soil, with its accumulation of humus in centuries past, but also the clays at considerable depth that have been exposed in excavations incident to building a city. The gardeners of the old world have learned that all soils are not rich enough to support a good growth of plants and have often given expression to this fact. How often, in the city, have we seen a hard clay surface in which the hollows were filled with bricks. plaster and other rubbish from the building, covered with bluegrass sod two inches thick, then when a drouth comes the owner wonders why the grass looks so brown and dead and the shrubbery so poor and scrawny. The cause is too apparent to need further attention.

If the soil is not such as you would select for the plants to

be grown, prepare it for them before planting anything in it. The more sand the soil contains the less effort will be required to separate the particles so the roots can penetrate it, and the more readily the root hairs can secure moisture and nourishment. The more clay in the soil the stiffer it will be and the more work it will require to separate the particles and mix humus with it. While it may not be necessary to trench all soils, especially the black alluvial soils, it will be an advantage in most cases to stir them to a considerable depth.

It is best to prepare the border in the fall when the ground is dry and other work is not so pressing on your time and attention, but the planting can be deferred until spring, except such plants as begin root growth in the fall, or those which start very early, in the spring, before the ground is in condition to work.

The border should be covered with a mulch of straw or leaves after the ground freezes to prevent heaving of plants by frequent freezing and thawing that occurs during the

winter and early spring.

Some of the tender perennials bloom the first year from seed, these may be treated as annuals. Tender biennials may be grown in a cold frame the first year and then stored in a pit or cellar the first winter, and planted in the border in the spring and they will bloom nicely. Many tender perennials may be carried over winter by lifting them in the fall and storing in a light cellar or pit; others may be covered heavily, so the ground ' does not freeze very hard. The material used for covering will depend on the nature of the plant to be protected. Plants having a green crown at the surface of the ground should be covered with mulch that will not hold moisture or they will rot. Leaves that absorb much moisture, like those of the soft maple, do not make a good covering for such plants. Use a covering for these plants that will admit air freely and that will remain dry through the winter. Plants that start growth from buds beneath the ground are not so easily affected by the material used in covering them.

A hardy annual is a plant that will endure a reasonable amount of climatic changes early in the season; a hardy biennial or perennial should survive for more than one year under these climatic conditions. These plants usually have a succulent stem, or one which dies to the ground in the fall, but the roots live in the earth through the winter. The number of these plants is large, and their habits varied to suit many conditions of soil and climate. They supply an abundance of flowers for cutting; make excellent plants for the border; are decorative when grown on the lawn in groups by themselves or with shrubbery, and are indispensable in planting a wild garden. They

are propagated from seeds, cuttings and division of the roots. To find favor with the gardener the plant must not be too aggressive, spreading beyond its bounds and killing out its neighbors, yet should be persistent enough to hold its own against encroachment from other plants; should have good foliage, or flowers and other desirable characteristics. Only a few of these hardy herbaceous plants are suitable for the formal garden; quite a number of them for the border or shrubbery, and a great many for the wild garden.

A border may be three to ten feet in width, six feet is wide enough, in most cases, and is more convenient in caring for the plants as you can reach to the center from either side without stepping on the border. As the name suggests it should be located along the boundary of the lot, or lawn, or shrubbery, or the side of a walk or building. It is usually irregular in outline, especially the edge next to the lawn, unless the location demands straight lines to harmonize with its surroundnigs.

To plant a border requires some skill and an intimate knowledge of plant life, gained from experience, to arrange it so as to be attractive throughout the season of growth. The colors should be properly distributed and massed so as to be effective: the height of the plants must also be considered and the time when they will be in bloom. The wild garden requires some thought to plant effectively, but does not need so much attention afterward.

ACHILLEA. Yarrow, Milfoil.

Plants of this genus have finely divided leaves, flowers in corymbs, and are common in Europe and Asia as well as in They are known under the names of Yarrow and America. Milfoil. They have some medicinal value and are used by herbalists for their sudorific and astringent effects on the system. It is said that Achilles used these plants to cure his wounded soldiers and that is how it happened that his name was given to this genus.

Achilleas grow freely and are easily propagated from seeds,

division of roots, or from cuttings.

A. millefolium is the common Yarrow, a weed in pastures and along public roads.

A. millefolium roseum is a red Yarrow occasionally met with as a border plant, and used to a limited extent as a cut flower.

A. tomentosa, a dwarf plant with yellow flowers; rock garden.

A. ptarmica is the Sneezewort of England. It is said that if you inhale the dust from the dried foliage it will make you sneeze, and that is why the name was given to this plant. The foliage of the Sneezewort is not as finely divided as that of the Milfoil. A garden form of this variety with double flowers, known under the name of Pearl, is indispensable where small white flowers are in demand. It is the best plant of the genus for garden culture and deserves more attention.

ACONITUM. Aconite, Monk's-hood, Wolf's-bane.

Aconitum is a large genus, but only a few species are found growing native in this country, none have been reported from this state. They are usually tall plants with long spikes, or racemes of blue, purple, white or yellow flowers. The tincture of aconite is used by the homeopathic practitioner in controlling the circulatory and the nervous system.

Plants of this genus thrive best in moist, shady location.

Height 2 to 5 feet. July to September.

We do not recommend these plants for garden use on account of the active poison found in all parts of the plant.

- A. lycoctonum is a pale yellow Wolf's-bane from Siberia, catalogued also under the name of barbatum, squarrosum and ochroleucum.
- A. napellus has blue flowers and is the variety which yields the aconite of the druggists.
- A. uncinatum is probably the most common of the native species in the United States.
- A. autumnale is a dwarf variety sometimes found in gardens in this state.

Acorus. Sweet-flag.

A small genus of which only two species are mentioned in the books on gardening. They have sword-shaped leaves much like an iris and grow in moist soil or in shallow water.

A. calamus, Sweet-flag, has been used as a mild stimulant; it imparts a flavor to liquors, and is said to be used by confectioners and perfumers in making some of their products. A native of marshes; grows about two feet high.

A. calamus variegatus, a garden form with yellow stripe on its leaves. A desirable addition to the water garden.

A. gramineus variegatus is a variegated garden form from Japan. This variety has a white stripe on the leaf and does not grow as tall as the American species.

ACTÆA. Baneberry.

Baneberries are found growing in moist, rich soil in shady places; they have small white flowers in racemes which later in the season give place to white or red berries. The foliage of the European species somewhat resembles that of the elder, hence the name.

Actæa alba and A. rubra are found growing in woodlands of

the state. They are both well suited for the wild garden or for a shady border with ferns.

ADIANTUM. Maiden-hair Fern.

A large genus of tropical plants. Two species, however, are found growing in this state.

A. pedatum, common Maiden-hair fern, grows in rich, moist soil in woods, and is worthy of a place in a shady border, under

trees, or on the north side of a building.

A. capillus-veneris, Venus-hair Fern, grows in rocky places and is less frequently met with. Both species are worthy of more attention.

ADLUMIA. Climbing Fumitory.

Only one species growing in woods in the eastern part of the state.

A. fungosa is a delicate biennial vine with pale pink or white flowers and fern-like foliage; it grows six to fifteen feet long and should be planted on the north side of a building or in a shady place among shrubbery. It grows freely from self-sown seed, but the young plants do not always live through the winter.

This plant is generally known under the name of A. cirrhosa,

Allegheny vine.

ADONIS.

This genus includes both annual and perennial plants. It is said that this flower sprang from the blood of Adonis. These old legends have no value, except as a suggestion of the ideas held by these ancient people of the origin of things. The names they gave to plants has helped to keep alive the history of the people who invaded their habitat. In this case, the legend applies to the annual varieties, like astivalis with crimson flowers.

Plants of this genus prefer sandy soil and a shady location.

A. vernalis, Ox-eye, is a perennial with bright yellow flowers. It is slow in coming into flower, and impatient of removal. The plant should be sheltered from strong winds. We have received only a few reports on this species; possibly not grown to any extent. Not very hardy. Height six to eighteen inches. May.

ALTHÆA. Hollyhock.

The genus contains about a dozen species. Althora rosea, from China, is the most common in gardens. The hollyhock is perennial, though it is better to treat it as a biennial. It grows readily from seed, which should be sown as soon as ripe. The double varieties do not produce seeds as freely as the single

sorts, nor are the plants as hardy. Named sorts are propagated

by division of the root stock.

The hollyhock disease (*Puccinia malvacearum*) has been very destructive to these plants. The rust is supposed to be a native of South America, and was introduced about forty years ago.

The hollyhock delights in a rich soil with plenty of moisture

during the season of growth.

The plants should be protected by mulch during winter, which should be kept as dry as possible, or the crowns will decay. The single varieties are quite hardy and need very little protection.

Seedsmen catalogue separate colors of the double sort, at a reasonable price, and we hope you will plant some of these old time, showy garden flowers.

ALYSSUM. Madwort.

This genus includes dwarf annual and perennial plants with more or less hairy stems, with white or yellow flowers. Propagated from seed or cuttings.

The Sweet Alyssum so much used in bedding is separated from this group by some botanists and called Kaniga maritimum.

Alyssum saxatile is an excellent plant for the rockery; has fragrant yellow flowers in the spring. The plants should be kept dry through the winter, if water stands about them the stems rot.

- A. saxatile variegatum has yellowish-white blotches on its leaves.
- A. saxatile compactum grows more compact than the species and is a better plant.
 - A. rostratum is taller and blooms later.

ANEMONE. Windflower.

This name was given on account of the light, feathery seeds

that were easily blown about by the wind.

Five species are native of the state. The wood anemone (A. quinquefolia) is frequently seen in woods in May. The Canadian anemone (A. canadensis) was common on the borders of sloughs and woods; has a white flower and grows about a foot high, blooms in May and June. These have not been planted to any extent in cultivated ground, but are good for the wild garden.

A. sylvestra does well in moist ground in a shady location.

A. pulsatilla is hardy, if planted in a dry location. The Pasque Flower is now separated from the anemones. We have

one native species, *Pulsatilla hirsutissima*, that is quite pretty, and deserves more attention; it grows on dry ridges.

The Japanese Windflowers, of which there are a number of named varieties offered in eastern catalogues, are excellent plants, but a little uncertain; sometimes they come through the winter nicely, and at other times fail. One can afford to give special attention to these fall blooming plants. They grow from one to three feet in height, and have single, or semidouble white—or pale—rose colored flowers. Whirlwind is a free blooming semidouble white, and Prince Henry has rich pink flowers.

ANTHEMIS. Chamomile.

Anthemis tinctora, Ox-eye Chamomile, or Golden Marguerite, is a native of Europe; has yellow flowers; foliage somewhat resembles Milfoil, is aromatic but not very ornamental. Sometimes used as a tonic and vermifuge; possibly for this reason it found a place in old gardens. Not very hardy.

ANTHERICUM.

Two species from Southern Europe are grown in gardens in this country. A. vittatum is referred by some gardeners to Chlorophytum; this is a half-hardy species grown in greenhouses for vases and bedding in summer.

A. liliastrum, St. Bruno's Lily, has fragrant white flowers with a green spot on each segment. Blooms in June. The foliage is rush-like. Give protection in winter. This plant is sometimes referred to Paradisea.

A. liliago, St. Bernard's Lily. Flowers not quite as large as those of St. Bruno's Lily. Foliage grass-like and grows about 18 inches in height.

These plants grow best in a rich sandy soil; should have plenty of water during growth, but the soil should be well drained so water will not stand about the roots. They should be kept dry through the winter. They are not hardy, but enough so to receive attention. They are more effective when planted in groups. Propagated by division of the root, or from seeds.

ANTIRRHINUM. Snap-Dragon.

Half-hardy perennials that will live through the winter with protection, but are more satisfactory when treated as annuals. They bloom freely from seed the first year.

APIOS.

The name was applied to the pear-shaped tubers of this plant. Apios tuberosa, Groundnut, is native, and a persistent weed,

at least that was our experience in getting rid of several large patches of it.

It has some value as an ornamental plant; has pretty purplish, pea-shaped, sweet scented flowers, and the vine can twine with considerable energy—at least that is my recollection of how it twined about the wheat and corn some fifty years ago, and believe it still retains that vigorous characteristic.

AQUILEGIA. Columbine.

Doctors disagree as to the meaning of this name. Some claim it refers to the claws of an eagle, others say it means to draw water, and was in olden times used as a diuretic, but is not now used in medicine.

Columbines are good border plants, are hardy and not very particular as to the kind of soil; they can adapt themselves to almost any kind. They respond wonderfully to good treatment. They are propagated from seed, also division of the plant. As the columbines are not long lived plants the stock should be kept up by sowing a few seeds every year or two. The plants produce seed freely, but these are slow in germinating; keep the well drained soil moist in a half-shady place until the young plants are large enough to transplant to the border.

A. canadensis is a native plant and one of the best columbines for garden culture; color yellow and red; stems about two feet in height. It makes a fine plant for the rockery; its thin arching stems with pendent flowers are very graceful on a rocky cliff. In rich soil in a border the plant grows more robust, with stiffer

stems.

A. chrysantha has yellow flowers with long straight spurs. It

grows taller than A. canadensis.

A. cærulea is from the Rocky mountains; its flowers are blue and white; not so tall and graceful as canadensis, but a good plant.

A. vulgaris is the columbine of Europe. There are many garden forms of vulgaris with different shades of color in the single and double flowers.

ARALIA.

Aralias are mostly tender plants, but there are two members of this genus that are native, and worthy of attention for a shady place in the wild garden, Wild Sarsaparilla and Spigenard. Their foliage is ornamental and the berries are prettier than the flowers.

ARISÆMA.

Plant with an acrid juice that you will remember if you

have ever tasted an Indian turnip; they grow in moist, rich soil in woods, not especially ornamental, but their curious shape attracts attention.

A. triphyllum, Indian turnip, has a three-parted leaf; purplish-brown spathe in May and June, and brilliant scarlet berries in midsummer.

A. draconitum, Green Dragon, has a single compound leaf on a long stalk, light green, two to three feet in height. Berries reddish-orange.

ARMERIA. Thrift.

These attractive little edging plants are tender and seldom seen in gardens in this state.

ARTEMESIA. Wormwood.

Artemesias are grown more for their attractive foliage than for the bloom.

A. abrotanum, Old Man, or Southernwood, is an aromatic plant sometimes found in old gardens, and occasionally used as a tonic and anthelmintic. The plant is hardy.

A. arbuscula and A. tridentata are the "sagebrush" of the western plains.

A. stellariana has silvery foliage and is used as a bedding plant.

ARUNDO.

A tall perennial reed grown for its foliage.

A. donax, Giant Reed, grows twelve to fifteen feet in height; not very hardy, but can be kept over winter by a heavy covering of leaves or clover-chaff.

A. donax variegata has white stripes on its leaves, not so robust in growth and more tender than donax. It is safer to lift these plants in the fall and store in a dry, frost proof cellar, then reset them in the spring as you would cannas.

ASCLEPIAS. Milkweed.

These are interesting plants, but too persistent when they get a start to find favor with gardeners; they are weeds.

A. tuberosa, Butterfly-weed, or Pleurisy Root, is an exception, and is worthy of attention. It has orange colored flowers in July and August. In medicine it is used as a diaphoretic.

ASPLENIUM. Spleenwort.

A large group of ferns of which we have four species in this state. They are all useful for shady or half-shady places.

A. augustifolium, Norrow-leaved Spleenwort, grows one and

a half to two feet in height; rather delicate, prefers shade, and should have rich, moist soil.

A. acrostichoides, Silvery Spleenwort, grows a foot to eighteen inches high; used for green by florists; give it good garden soil, with shade.

A. platyneuron, Ebony Spleenwort, is a delicate plant and does better in the rockery than in the border; grows about one

foot in height; half shady place.

A. filix-famina, Lady Fern. This is the best of the group. There are a number of garden forms. It grows from one to three feet in height.

ASTERS. Starworts.

Thirty-eight species have been reported growing in this state; some are weeds, others have merit as decorative plants. Not much work has been done by gardeners to improve these plants, though a dozen or more improved garden strains are now offered to the trade. A few of the best native species are Novæangliæ, Novi-belgii, Lævis, and Ptarmicoides. The asters are good for the wild garden.

(To be continued.)

THE CONIFERS OF IOWA.

BY A. ESTELLA PADDOCK.

Iowa being pre-eminently a prairie state, but little attention has been given to her forest areas, and such as has been considered has had to do largely with the deciduous trees that comprise almost the entire body of our forests.

Five specimens only occur: Albies balsamea, Juniperus communis, Juniperus Virginiana, Pinus strobus and Taxus canadensis.

DESCRIPTION.

The red cedar (Juniperus Virginiana, L.) is the most widely known. As a tree its maximum height is 100 feet, with a diameter of five feet. In young trees the outline is conical, while older trees present an almost cylindrical form. The leaves are opposite, spiny-tipped and in the mature foliage appear scale like and acute, in four ranks giving the twig a quadrangular appearance. The cones are berry-like, light blue, glaucous, about one-fourth inch in diameter and borne on straight peduncle-like branchlets of less than their own length. The fruit has one to two seeds. The wood is soft, not strong, straight-grained, compact, odorous, red; sapwood white. Large trees are used for posts and supplying woods for lead pencils. In this state the tree attains a height of from twenty to forty feet. In local-

ities where the tree is cultivated it may be found wild in the woods planted no doubt by birds.

Closely resembling the dwarf forms of the former is the common juniper (Juniper communis), in this state a low shrub with prostrate branches. The bark, like that of the cedar, is shreddy, the leaves are subulate, rigid, spreading, mostly straight, prickly-pointed, often with smaller ones fascicled in their axils, channeled and commonly whitened on the upper surface. The berry-like cones are sessile or nearly so, and dark blue in color. The fruit of the tree is used in flavoring gin.

The yew, or ground hemlock, (Taxus canadensis) is a low straggling bush, not over five feet in height. The leaves are dark green on both sides, narrowly linear, mucronate at the apex and narrowed at the base. They are persistent on the twig when drying. The staminate flowers are numerous in a globose ament. The ovules are usually few, solitary, with an annular disk, which becomes cup-shaped around its base, and at length pulpy and berry-like, globular and red, nearly enclosing the nut-like seed.

The white pine, (Pinus strobus) is a forest tree whose maximum height is one hundred seventy feet, its growth in Iowa probably being not more than fifty feet. The bark of the tree is nearly smooth, except in age, and dark green. The branches are horizontal, verticillate. The leaves are five in a sheath, very slender, pale green, glaucous, having a single fibrovascular bundle and no stomata on the dorsal side. The sheath is loose and deciduous. The staminate flowers are terminal. The pistillate subterreminal. The cones are drooping, cylindrical and often slightly curved, from four to six inches long and about one inch thick when the scales are closed. The scales are but slightly thickened at the end and without prickle or point. The wood is soft, light, or white yellowish, and in large trees nearly free from resin.

The white pine is the most valuable of all our forest trees, furnishing great quantities of lumber. It forms dense forests

in the Alleghanies.

The balsam fir (Abies balsamea, Miller) is a slender forest tree attaining a height of twenty to fifty feet in Iowa. The bark is smooth, warty, with resinous blisters. The leaves are fragrant in drying, dark green above, pale beneath, or in younger leaves conspicuously whitened on the lower surface, the mid-rib prominent. The cones are cylindrical, two to four inches long, upright, arranged in rows on upper side of the branches, violet or purplish when young. The bracts are obovate surrulate, tipped with an abrupt slender point, shorter than the scales. The wood is soft and weak, light brown. Canada balsam is a product of the resinous bark.

Thus far the conifers are reported from eighteen counties of the state; the red cedar being the widest in its distribution. It is found along the streams in northeastern Iowa, and at various points along the Mississippi, Cedar, Iowa and Des Moines rivers, as well as at Sioux City, and in the vicinity of the lakes in northern Iowa.

The localities for the yew (Taxus canadensis) coincide with those of the red cedar, except those in the particular places mentioned, the Des Moines river, Steamboat Rock, Van Buren and Lee counties. Both occur in Allamakee, Fayette, Clinton, Dubuque, Delaware and Johnson counties. The yew is found also in Linn county. The cedar, though probably found there, not being reported.

The common juniper (Juniperus communus) is much more restricted in its occurrence, being sometimes confounded with dwarf plants of the cedar. It occurs with the cedar at Steamboat Rock, and in Johnson, Delaware, Dubuque and Allamakee

counties.

"The white pine is a very local tree in this state, being confined to the sandstone ledges of eastern and central Iowa. The white pine is not, however, found in this state wherever the sandstone ledges appear. Extensive carboniferous sandstone deposits occur along the Des Moines from Moingona south, and while the forest growth at various points is somewhat similar to that of Hardin county (Steamboat Rock), three of the prevailing species do not occur, namely, *Pinus strobus*, and two birches."

"The white pine (*Pinus strobus*) is not known native in Iowa except in driftless regions, or in their immediate vicinity."

"With the exception of the Muscatine and Steamboat Rock vicinities so far as is known, *Pinus strobus* grows only in the driftless area of northeastern Iowa. At Steamboat Rock the plant has occurred for many years on and near the sandstone outcrop at the moraine between the Kansas and the Wisconsin drift. It was first reported by David Dale Owen."

"The southern extension of the pine is on Pine creek in Mus-

catine county."

In Dubuque, Delaware, Clayton, Allamakee, Fayette and Winneshiek counties the tree is found in groups of greater or less area.

The region near Myron on the Yellow river, in Allamakee county, presents the most typical features of the conifers in Iowa. Miss King, who visited this locality the past season, de-

¹ Dr. Pammel, Iowa Geol. Sur. Vol. 10, p. 306.

² T. H. Macbride, Iowa Geol. Sur. Vol. 10, p. 629.

³ Rept. Geol. Surv. Wis., Iowa, Minn. 102.

scribes the valley, whose trend is east and west. On the slope with the southern exposure, Pinus strobus occurs in considerable numbers, though of a straggling growth. The growth is open. accompanied by Juniperus virginiana and a number of grasses. On the opposite hillside, with a northern exposure, a fine growth of Abies balsamea occurs; here the undergrowth is more dense. Taxus canadensis being common, while ferns abound. The paper birch is the chief deciduous tree. This slope is naturally more damp than the opposite one. But one other locality for the balsam fir has thus been verified, near Decorah, the specimen being in the collection of Mr. Holway. That these species once occurred more abundantly, we have considerable evidence. Just across the Iowa line, near Springfield, Minn., along Pine creek, Dr. Pammel was told that a grove of American larch was once The occurrence of Morus rubra lends credence to the statements, as well as the occurrence just across the Mississippi, near La Crosse, of an extensive Tamarack swamp. (It is interesting here to know that Dr. Pammel has collected Pinus resinosa in the Black river bottoms, Pinus banksiana at Sparta and in the hemlock Thuga canadensis at Bloomingdale, Wisconsin.) The white pine grows in considerable aboundance in southeastern Minnesota.

UTILITY.

Of these trees *Pinus strobus*, *Jumperus Virginiana* and *Abies balsamea* are available for ornamental purposes, the last named, however, being scarcely hardy in central Iowa, and ornamental only when young; when old, it is scraggly.

The cedar is an ornamental shrub, when young being capable of much pruning and being hardy in almost any locality. Its conservative form makes it a desirable tree for lawns, especially admired during the winter season. It is also adapted to use in cemeteries. The white pine is a pleasing tree, for shade and ornament, its spreading branches, smooth bark, bright color, and regular outline, with its hardiness, commend it to a much more extensive cultivation than it at present commands. Juniperus communis and Taxus canadensis are not adapted to cultivation.



On the left is the common Golden-rod, S. speciosa, on the right S. latifolia.

The Editor's Page.

A summary of the reports on the condition of the fruit crop in Iowa for July is as follows: Summer apples, 32 per cent; fall apples, 33 per cent; winter apples, 27 per cent; pears, 14 per cent; Americana plums, 22 per cent; domestica plums, 21 per cent; Japanese plums, 17 per cent; peaches, 36 per cent; blackberries, 81 per cent; grapes, 69 per cent of a full crop. The best condition is in the eastern part of the state. The average of the crop is about three per cent better than at this time last year. Apples are 3 and grapes 9 per cent lower than last year; blackberries are 3, peaches 12, and plums 26 per cent better than a year ago.

The sixth annual meeting of the American Apple Growers' Congress will be held in the Southern Hotel at St. Louis, August 11th and 12th, 1908. The program includes such topics as "Spraying Mixtures," "Shall We Spray in Off Years?" "Shipping Apples to the Market in Bulk," "Exporting Apples," "From Grower to Consumer," "Packages and Packing," "Effects on the Crop of Cross Pollenation," "Off Grade Apples as Affected by Pure Food Laws," "Legislation Affecting Orchards and the Distribution of Nursery Stock," "Benefits of Cooperation and Organization," and "Pruning for Fruit." All of these subjects will be handled by men of large experience who have gained a national reputation in their special line of work. It will well repay any commercial apple grower to attend this meeting. We gain many useful ideas by coming in touch with men from different parts of the country who are working along lines similar to those in which we are engaged. The proceedings are sent to all members of the congress.

An interesting specimen was brought to the office this week on the leaf of a Virginia Creeper, with these queries, "What is it?" "What are they?"

The worm in question was a Hog-caterpillar (Ampelophage myron), the cocoons on its back were Microgasters. We counted 73 of these white cocoons about one-eighth of an inch long on the back of this worm, which was only about two inches in length. We put the whole exhibit under a bell-glass and in two days we had a swarm of small black flies, and lively little creat-

ures they were too. They simply pushed up the lid on top of their white houses and crawled out and were ready for business in a few minutes after they left their apartments. If worms are conscious of pain what a world of suffering this one must have endured with such a brood wiggling through its internal organism and feeding on its vitals.

. . .

The Society of Iowa Florists meets in Des Moines August 26, during the State Fair. I wish all the florists in the state could attend this meeting and tell us what they have done toward making this world more beautiful and habitable through the gentle administration of that art which doth improve nature. I would have you grow flowers because I believe association with them has a tendency to broaden the intellect by stimulating inquiry into their marvelous structures of wonderful beauty. In flowers we have some of the most exquisite colors known to man, and the most beautiful forms the human eye has ever seen. Those who are in love with plant life get so close to the great heart of nature that they can almost feel the pulsations of the Infinite, the True, the Beautiful, the Good. It makes life worth living, and a home surrounded by these attributes of the Deity the dearest spot on earth. Plant flowers.

. . .

Have you ever looked down into the molten amber of a thousand Marechal Niel rosebuds and let their exquisite perfume pervade your being? It is worth a thousand dollars to any man to have gone through such an experience for ten years.

. . .

Did you ever grow the Lemon Verbena (Lippia citriodora) in the garden? It grows there as readily as a geranium. No, it is not hardy; take it up in the fall and put it in a box with plenty of soil about its roots and then store it in a cellar, that will keep potatoes in good condition until spring, and it will grow the next year if you plant it in the garden again.

If there is another plant that has as much fragrance in its foliage as the Lemon Verbena it is Lemon Grass (Andrapogon schænanthus). If you have never tried it get a plant next spring and treat it as you would a Lemon Verbena and you will be delighted with the rich perfume of its leaves. Is it pretty? No, but like the homely mignonette, its plebian form is enveloped by a sheen of fragrance that makes it glow with celestial brightness.

Don't starve one of the senses to feast the other one. We know the nose is an humble organ and often gets snubbed in unwelcome places; but it can inhale the aroma of mellow apples:

and luscious melons until the mouth waters for them. Do not let it be a slave to the stomach, for it is capable of ministering to a nobler master, and can carry a message from some of Flora's children that may wing the soul to a realm of empyreal emotions. Give the nose a chance to enrich the soul with earth's choicest and sweetest perfumes. Be not like him who saw

"A primrose by the river brim, A yellow primrose was to him— And it was nothing more,"

for such are only fit for "strategem, treason and spoils."

. . .

Pandora was not a success at keeping the lid on. We can find choice nuggets every day if we will only look for them.

THE USE OF OUR WILD FLOWERS FOR THE GARDEN.

BY PROFESSOR L. H. PAMMEL, AMES.

Our wild flowers have been much neglected by the cultivator. The early settlers of our country naturally were much attached to the plants found about their homes in far off Europe, and hence the European cultivated plants only found a place in mother's garden. The same thing may be said of the plants cultivated in our parks and larger gardens. Wherever gardeners were employed in the early days, they were without exception people who had been trained in Europe, and naturally they brought with them a love for the plants of their European gardens. Do not get the impression that the Europeans neglected exotics; on the contrary the European gardener of a century ago and earlier grew many exotic plants in his garden, or at least they were to be found in the royal gardens. Several horticultural societies, individuals and even governments appropriated money to defray expenses of individuals to add to the collection of plants to be grown for decorative purposes. So it happened that our early settlers occasionally brought the seed of some of our own native plants to this country to be used in gardens. But there were not many of these indigenous plants used for this purpose. The history of the cultivation of one of these American plants may here be given. The Dahlia, a well known plant named after the Swedish botanist, Dr. Dahl. In 1787 a Frenchman, Nicholas Joseph Thierry Menonville, found the dahlia

¹ Dean, Richard; Fift, Robert: Ballentyne, John; Jones, Stephen and Arthburton, William. The Dahlia; its history and cultivation, 81. Numerous illustrations. Macmillan & Co., London, 1897.

growing in a garden near Guaxana; Vincentes Cervantes, in 1789, who was director of the botanical garden in Mexico, sent seeds of this plant to the Royal Gardens at Madrid. From this garden they were sent to the Marquis of Bute, whose wife culti-

vated the plant for a few years.

John Fraser, an English nurseryman to whom we are indebted for the introduction of so many plants, started the culture of this plant in England in 1802 from seeds obtained from Paris. The culture of this plant spread very slowly. A third supply was obtained from France in 1815 and from this time the spread was rapid. The flowers began to show doubling, and it acquired great popularity.

SOME LONG AND WELL KNOWN CULTIVATED PLANTS OF NORTH AMERICA.

I shall not stop to trace the history of the cultivation of our wild plants. Some others, however, have a long history.

Quite a number of indigenous North American plants have been used to decorate European and American gardens. Of these

I may enumerate a few of the popular plants.

The genus Cosmos, one of the most handsome of all our autumn flowering plants, is native to Mexico. The genus Cosmos contains about twenty species of annual or perennial herbs. Wm. Miller¹ says:

"Among the garden annuals that have come into prominence in recent years, Cosmos has a most brilliant future. Until 1895 there were in the two leading species only three strongly marked

colors, white, pink and crimson."

Rudbeckia laciniata.—The specimen of the genus Rudbeckia, or cone flower, are all native of North America, and one species, Rudbeckia laciniata, has come into prominence during the last decade as a highly ornamental plant, owing to the doubling of its flowers.

Helianthus annuus.—The Helianthus annuus has been cultivated for some time as an ornamental plant, and also because of the value of the seed. This is especially true in Russia, Egypt and India, seeds of the large seeded variety being sold in Russia for the same purpose that we use peanuts. The fact that there are quite a number of varieties of the common sun flower indicates that it has been improved to a considerable extent from its native form. Thus Mr. Fletcher² refers to such varieties as Californicus, citrinus, globosus, fistulosus, nanus fl. pl., Russian Giant, variegatus. We might mention here, however, that sev-

¹ Bailey. Cyclopedia of American Horticulture, 1:384.

² Bailey. Cyclopedia of American Horticulture, 2:721.

eral other species of Helianthus are cultivated in fact, like *H. argophyllus*, *H. debilis*, *H. orgyalis*, *H. rigidus*, *H. grosse-seratus*, *H. decapetalus*, and many others are suitable for cultivation. All that is needed is a little bit of improvement.

Phlox maculata.—The species of the genus Phlox have been cultivated for a considerable time and all of the species belong to North America except one Chilian and the P. sibirica, which grows in Asiatic Russia. All of our annuals are derived from the Texas P. drummondii, but our perennial phloxes, there are many species; our most important ones under cultivation are P. paniculata and P. maculata. These are certainly most handsome perennial species. The Phlox paniculata is probably the parent of a large number of our perennial phloxes. The P. subulata is another handsome little species that is widely cultivated as a border plant.

WHY OUR NATIVE PLANTS SHOULD BE CULTIVATED.

The cultivation of our wild plants should awaken the enthusiasm of those who are interested in studying nature. The growing of our wild flowers is highly desirable for school grounds. It will increase the powers of observation of the child, if the child but watch our wild flowers. By cultivating our wild flowers the children would certainly enjoy nature more than they now do. Perhaps they might get some of the inspiration of Hamilton Gibson, who says in his well known book, "Sharp Eyes," "There is, in brief, a cordial recommendation and invitation to walk the fields with me, and reap the perpetual harvest of a quiet eye, which nature everywhere bestows; to witness with me the strange revelations of this wild bal masque; to laugh, to admire, to study, to ponder, to philosophize—between the lines—to question, and always to rejoice and give thanks!"

We must all agree in part with Mrs. William Starr Dana,² that "the pleasures of a walk in the woods and fields is enhanced a hundred fold by some little knowledge of the flowers which we meet at every turn. Their names alone serve as a clew to their entire histories, giving us that sense of companionship with our surroundings, which is so necessary to the full enjoyment of outdoor life."

We have a long list of hardy native perennials, annuals, and biennials that may be used for our gardens, and I want to make an earnest plea for their cultivation. Few people appreciate their beauty. A writer in Meehan's Monthly³ says, "Few per-

¹ Sharp Eyes, a rambler's calendar of fifty-two weeks among insects, birds, and flowers, 322. Numerous figures. New York, Harper & Bros.

² How to Know the Wild Flowers, a guide to the names, haunts and habits of our common wild flowers, 373. With numerous illustrations. Chas. Scribner's Sons, New York, Rev. Ed. 1895.

³ Augusta Schenck Kalbfleish, Some of Our Wild Flowers, Meehan's Monthly, 9:84.

sons, I think, realize the beauty and wealth of our native wild flowers. At this season of the year and, indeed, until November, the country abounds in a succession of flowers, the beauty of which surprises many floriculturists." We should turn our attention then more assiduously to the cultivation of our native plants as the Japanese do. Prof. Emory E. Smith says the Japanese love nature not as a matter of dollars and cents, but because they have found respectful happiness in the devotion. Their taste is correct and refined; it is not the rare, gaudy exotic that is most highly prized, but the common flowers of their country which are taken in natural sequence and by study and culture made the source of healthful national enjoyment."



Spring Beauty (Claytonia Virginica). Common in moist woods.

⁴ Meehan's Monthly, 9:143.

WHAT PLANTS SHOULD BE CULTIVATED.

We have these wild flowers in our gardens in bloom from April to frost in October. During the month of April when the pussy-willow is in its glory and the hum of the busy bee may be heard around the flowers, the pasque flower (Anemone patens, var. Nuttallian) or, as it is commonly called, crocus, rears its large delicate flowers from among the old grass and dead stems of previous seasons on some gravelly bank or knoll. Soon after the late snows have melted with winter still ruling the land-scape, another early harbinger peeps through the leaves of our woods, the Hepatica (Hepatica triloba). What child does not welcome those early flowers? It recalls the happy days of our childhood when we went out in the woods to gather the Hepatica



Hepatica (Hepatica acutiloba). The earliest of our spring flowers. and Pasque flower. These plants are soon followed by the

Dutchman's Breeches (Dicentra cucullaria). The delicate flowers and leaves hardly look as though they could stand frost, and

yet the cool April nights with frost during the night, do not injure these woodland fragile plants. In our bogs we find the marsh marigold (Caltha palustris). This, like the prettiest of our willows (Salix rostrata), is an inhabitant of cold bogs and blooms with it. The snow trillium (Trillium nivale) rears its white flowers in our woods during the early part of April. April is also the month for the appearance of several other members of the Crowfoot family, namely the Isopyrum biternatum, rue anemone (Anemone thalictroides) and the common wood anemone (Anemone nemorosa). The bloodroot (Sanguinaria canadensis) is another early April plant, as is also the spring beauty (Claytonia virginiana). William Cullen Bryant, writing of the wood anemone, says:

Within the woods, Whose young and half transparent leaves scarce cast A shade, gay circles of Anemones Danced on their stalks.

Violets begin to appear during the last days of April and they are among the best known of our spring flowers, but none of these have been cultivated. They deserve to be, as they require almost no care. There are many species of violets, our most common one being the common blue (Viola palmata, var. cucullata). Then we have the yellow violet (V. pubescens), birdfoot (V. pedata), and the (V. pedatifida). In some sections of the state we have the white violet (V. striata), (V. canadensis) and (V. blanda). The yellow and our common blue violets are easily grown, and they certainly ought to have a place in some cozy corner or nook.

During the early month of May we have a harvest of spring flowers in our woods and prairies. The wood pink or Sweet William (Phlox divaricata). The common cranesbill (Geranium maculatum), whose delicate purple flowers are much admired. The bellwort (Mertensia virginica) has long been cultivated. Another early May flower, our wild columbine (Aquilegia canadensis), increases in size when cultivated, but many lovers of plants think the flowers are not nearly so pretty as in their wild state. The prairies are now blue, yellow and red with their bloom of spring flowers. We may mention here the prairie Sweet William (Phlox pilosa), blue-eyed grass (Sisyrinchium augustifolium), star grass (Hypoxis erecta), wild vetch (Vicia americana), everlastings (Lathyrus venosus), (L. palustris), the puccoons (Lithospernum canescens, L. augustifolia). The latter part of May brings forth the native iris (I. versicolor), certainly susceptible of improvement.

The month of June is given over to the roses, of which we have a single species (Rosa blanda, var. arkansana). The even-

ing primrose (Enothera biennis), especially the large western variety, is a much more desirable plant; and why not cultivate the white pink (Silene stellata)? Our native lilies (Lilium philadelphicum and L. canadensis) are also abundant. should we forget the moccasin flower. We have only three species in Iowa. The yellow (Cypridium pubescens) occurs in our rich woods; it is becoming a somewhat rare plant. The small white moccasin flower (C. candidum) is also rare in marshes in central Iowa, though now common in northwestern Iowa. The queen of all, however, is the large lady's slipper (C. spectabile), now rarely seen in central Iowa. It used to occur in rich low woods in the vicinity of Ames, but has now disappeared. There are quite a number found in Hardin county along the Iowa river, but the picture shown here is a group found in a tamarack swamp beneath the shade of tamarack trees near La Crosse, Wisconsin, the flower fern along with it. An early but rare orchid (Orchis spectabilis) is most desirable in a shady place.

In July and August the fall flowers appear. First of all we have the milk weed (Asclepias incarnata), which is the prettiest of our species, and grows in low grounds. Except the white-flowered species (A. verticillata), none of the others should be

cultivated, because of their weedy nature.

There surely must be many gardens in the state where our water plants can be grown. Two of the species flower in July, the white water lily (Nymphæa tuberosa). The yellow nelumbo, the lotus or chinquapin (Nelumbo lutea), is found along the Mississippi as far north as La Crosse, Wisconsin. The wild rice (Zizania aquatica), arrow-head (Sagittaria variabilis), and cattail (Typha latifolia), are unique plants in their places.

July is the month for the appearance of horse mint (Monarda fistulosa), and the earliest goldenrod (Solidago missouriensis), followed by the Canadian goldenrod (S. canadensis). The thistles, too, now appear, especially our June thistle (Cnicus io-

wensis).

August is the month for the pretty species of lobelia, the cardinal flower (Lobelia cardinalis), the rich cardinal of this flower should alone commend it as a most desirable plant. Contrast with the cardinal the rich blue of the greater lobelia (Lobelia syphilitica). Bonesets also appear; the white woodland boneset (Eupatorium ageratoides), the most delicate of the genus. The old-fashioned marsh boneset (E. perfoliatum), used by our mothers, is the best known of the genus.

Nor should we forget to mention the blazing stars (Liatris spicata, L. pycnostachya), with their beautiful purple flowers. The early asters and sun-flowers begin during the late days in August, keeping up their perpetual bloom till frost. What a

choice array of asters, the blues and the whites! They seem common-place, but in coloring and profusion of flowers they have no equal among our autumn plants. The prettiest of all is the New England aster (Aster novæ angliæ), so common along the banks of streams, and then there is the white flowered A. novi belgi, so common in our rich woods. The autumn is conspicuous for its gentians in some quarters, especially the blue fringed gentian and white (Gentiana andrewsii). G. quinqueflora, G. crinita (blue), G. flavida (white). The purple Gerardia (C. tenuifolia), and the Mentzelia appears in northwestern Iowa in August.

Mr. J. P. Pederson, who has had some experience in growing wild plants, comments as to the success he has had with them as follows: "I have transplanted wagon loads of wild flowers from woods and prairies, from rich ground and poor sand, plants growing in the sunlight and plants growing in the shade, and I say to those who never tried it before, if you think your soil is not the right kind, or your bed is too exposed to the sun, plant the flower you have found anyhow, and if the soil is anywhere near common garden soil and the bed is given the usual care in weeding and judicious watering, you will, most probably, find that your plant from the deep shade of the forest or from the

sandhills is perfectly well satisfied with the change.

"I have seen Cypripedium calceolus, a plant that grows in calcareous ground, in the deepest shade of big trees and shrubs, transferred to an open bed in the garden, where it grew and flowered to perfection; and I have planted Elymus arenarius in a prepared bed of sand and noticed it sending long runners into the stiff clayey soil surrounding the bed, and from there throwing up shoots as strong as those from the bed itself. Of course, to go the opposite way, taking plants naturally growing in the open sunlight and placing them in the shade, or trying to make plants inhabiting rich ground grow in very poor, sandy soil, would be to invite failure; but no one would think of such an experiment unless he could get no other plants or provide no better ground. And, of course, if you want to use plants that naturally grow in the shade it is advisable to place them in a shady spot, if you have such an one in your garden, both because you can make no other plants grow there and prosper, and also because they look most natural in such a position. And if you want to use plants naturally inhabiting sandy and dry places, why plant them in such a place, if you have one, for similar reasons.

"But do not bother yourself with natural soil from the woods, except in very special cases, such as growing Azaleas

¹ Growing Wild Flowers, Am. Gardening, 22:523.

and others of that family, or certain ferns and orchids, etc. The great host of wild flowers in general will be very well satisfied with good, rich garden soil.

"Prof. W. E. Britton¹ says: 'To a lover of wild flowers many of the cultivated forms commonly found growing in small gardens lack much of the irresistible charm and attractiveness possessed by their indigenous relatives. Yet how seldom do we find people who are trying to cultivate the wild flowers. One is led to presume that people choose to pass by the delicate and graceful native flowers for the often bold and showy but not more beautiful varieties figured in such brilliant colors in florists' and seedsmen's catalogues—a presumption which I fear is but too true.'

"There seems to be a strong desire to obtain new and rare plants from the tropics or from foreign countries, for the sake of having something which the neighbors have not, with apparently little or no regard to the particular soil, climate, and, in fact, all conditions to which the plant is expected to conform."

The writer has successfully planted and grown the common blue violet (Viola palmata, var cucullata), the lungwort or bellwort (Mertensia virginica). He has seen scores of others cultivated like the yellow moccasin flower (Cypripedium pubescens). A friend of the writer's, Dr. Stennett, of Chicago, has an unusually large collection of wild flowers growing in his garden and he derives much pleasure in growing these. One may use the wild plants for a border and have a succession of bloom from early spring to late autumn. What could be prettier than the violets, lungworts, columbine or early blue larkspur (Delphinium tricone) in spring, followed by Sweet William (Phlox paniculata), blue larkspur of the west (Delphinium geyeris, D. azureum)? I like the blue lupine of the mountain (Lupinus argentus) and the Rocky mountain columbine (Aquilegia cœrulea). These would naturally follow our spring plants. Add to these some of the Rocky mountain species of thistle (Cnicus nelsonii) or even our species (C. iowensis and C. discolor) and you have a splendid list to choose from. In the autumn we have an array of beautiful flowers equalled no where else. At least a dozen or fifteen species of goldenrod (Solidago). One deserves particular mention, the large flowered goldenrod (Solidago speciosa). Prof. N. W. Rowles calls the goldenrod the queen of the American autumn.2 He says: "Roadsides, hillsides and swales are bright with goldenrods and asters in these waning autumn days. Often they linger until well into November, when the ground freezes hard at night and there are scurries of snow in the blustery days.

¹ Wild Flowers in the Garden, Am. Gardening, 22:87.

² Country Life, 1:83.

They are characteristic of the northern part of the country. As far west as Oregon one sees the goldenrod along the country roadside, but when he descends into the valleys of California he loses them for another and strange vegetation. So common are the goldenrods that many people despise them—those persons who associate interesting objects only with some foreign land that they have not seen. Yet, the goldenrods, and all other native plants, are more appreciated today than they were a generation ago. Look in the old books and in the new for pleasant descriptions of the goldenrod."

The plant should be more popular than it is and I sincerely hope its cultivation may be extended. They grow easily and well under many different conditions. Some of the goldenrods grow in the woods, others in swales, others along the roadside, and many are inhabitants of our prairies and pastures, some being weedy in their character. What is prettier than a field covered with goldenrod? No wonder that this plant has had many advocates as a state and national flower. The genus is practically American and mostly confined to eastern North America, although there are representatives along the Pacific coast.

I might invite your attention to a few others in this connec-The Rocky mountain bee plant (Cleome integrefolia) of western Iowa, long cultivated as an ornamental plant, but a common weed of our western plains. Take that autumn turtlehead (Chelone glabra), common in northern swamps, but rarely found in central Iowa. What one of our native plants is more ornamental than the large beard-tongue (Penstemon grandiflora) of the lakes of western Iowa and of Muscatine Island? Take the daisy firebane (Erigeron annum) of our meadows, the fields. white with these tiny flowers. While it can scarcely compare with the ox-eye daisy in beauty it is not likely to prove injurious. Here is a low meadow in June covered with the white anemone-(Pennsylvanica). The pretty loco weed (Oxytropis lamberti) covers the loess bluffs along the Missouri, a hardy vigorous perennial. From every section of our country there are numerous. plants which ought to find a place in our gardens.

THE CULTIVATION OF MEDICINAL PLANTS.

I think the cultivation of plants for medicinal purposes should be carried on more extensively than it is at the present day. We rarely see these plants cultivated now and yet in the old garden of our mothers many of these were cultivated. Some of these medicinal plants have most pretty flowers, like the *Aconite*, *Digitalis*, *Arnica*. Here let me say that the Rocky mountain arnica is a most beautiful plant with its nodding "flowers" (heads) and the delightful odor coming from the bruised leaves. Take

the Rocky mountain aconite (A. columbianum) with its blue flowers, is beautiful. Of course, most of these plants can be grown in the back garden and care must be taken if the poisonous species are grown, that they are not eaten. The acrid principles in the aconite precludes much danger from human consumption. Our native species are not used in medicine, but they have the same principles. If we consider the European species, it is certainly true that they would not only be ornamental, but a considerable revenue might be derived, as Dr. Rusby says that our supply of drugs is uniformly poor.¹

EDIBLE FUNGI, THEIR RECOGNITION AND METHOD OF COOKING.

BY MISS M. ETHELDA MORRISON.

From early spring to late autumn our fields and woods furnish an abundant succession of fungi, many species being edible, and a few species desirable and useful as food accessories. Until very recently the possibilities in edible fungi were held in ill repute, from fear of poisonous species, that almost all of this food supply has gone to waste.

Now, through frequent magazine articles and bulletins published by the United States Department of Agriculture, knowl-

edge of the edible fungi is becoming more general.

Among the edible fungi are found many of the toadstools; all puffballs, so far as known, and truffles, though for flavor and nutrition few species are really desirable. The demand for edible fungi is such that mushroom culture has been undertaken with such success that the mushroom has become a regular article of commerce.

It is quite generally believed that the umbrella-shaped fungiare divided into two classes—the toadstool, which is poisonous, and the edible mushroom. All umbrella-shaped fungiare toadstools, though the name mushroom has been given a few of the best known edible forms.

The mushroom is a vegetable easily prepared for the table and forms an appetizing addition to the menu. It is usually eaten while fresh, but may be canned or dried.

The first thing the would-be mycophagist, or fungus eater, wishes to learn, is the difference between the edible fungus and the poisonous fungus. All knowledge of the edible qualities of fungi has been gained through experience. People have eaten the former and found them to be good, while the latter have produced illness and, in some cases, death.

The principal groups of fungi among which we find edible

¹ H. H. Rusby, The Cultivation of Medicinal Plants, Am. Gardening, 22:73.

species, are the Hymenomycetes, or those having the spore-bearing surface exposed, as in the Agarics and Polyporei; the Gasteromycetes, or those which have the spore bearing surface inclosed in a spherical case, called a peridium, which ruptures when mature and expels the spore dust as in the puffball, and the Hydneir or teeth-bearing fungi, the spores being borne on the teeth.

All fungi grow from spawn or mycelium which is buried in the ground, decayed wood or bark of trees and in other substances. The toadstools and puffballs first appear as small balls or buttons which, in the case of toadstools, expand very soon after reaching the surface. Mushrooms do not grow in a night, as is so commonly said, for the spawn may be weeks, months and even years in developing the button, which when once formed rapidly develops into the mature toadstool. The developed fungi is the fruit of the spawn, or plant. The cap of the toadstool is the pileus and the under laminated surface the gills. Spores are the microscopic, dust-like bodies, which fall from the gill surface, and are to the fungi what seeds are to flowering plants. The button stage being undeveloped should not be collected by the beginner.

As the first step in the recognition of the toadstool the collector should secure a few fresh, fully developed specimens, including the root, then make a spore print by cutting off the stem and laying the cap, gill side down, on white paper, covering it with a glass tumbler, bell jar or something to exclude the air, as a draft may carry the spores away.

Hamilton Gibson gives the following rules for mushroom collections:

- (1) Avoid every mushroom having a cup or suggestion of such at the base. The fatal poisons are thus excluded.
- (2) Exclude those having an unpleasant odor, peppery, bitter, or those of unpalatable flavor or tough consistency.
- (3) Exclude those infested with worms or in an advanced stage of decay.
- (4) Any doubtful or unrecognized specimen should be kept by itself, not in contact with or inclosed in the same basket with other species. To these may be added the caution: If the spores are white and the gills remain white on drying, you have a doubtful specimen which should be laid aside for further identification.

The mushroom-poison which has dealt death to many even since the time of Nero, is a poisonous alkaloid which takes effect about eight or ten hours after its ingestion.

M. Julius A. Palmer, of Boston, about 1879 discovered the fact of its confinement to but one fungus family, the Amanita.

Many mushrooms of other families as the *Russula emetica* and certain *Lactaria* possess ingredients chemically harmful to the human system but give a fair warning of their nature, either by taste or odor.

The Hymenomycetes is subdivided into several orders, the discrimination being based on the diverse character of the spore surface. The first and one of the largest orders is the Agaracini or gill-bearing fungi. The most perfect botanical type of the Agaric is the Amanita, and since in the family we find our deadly foe we will first study it.

The young Amanita is enclosed in a volva, or sack, which bursting in growth partly adheres to the top of the pileus and partly forms a cup at the base. The adhering parts on the pileus may be washed off by the rain. The young mushroom inside the volva has a veil, as does the *campestris* and *arvensis*, or horse mushroom, which, breaking away as the pileus expands, forms a ring or annulus about the stem.

The two most common poisonous forms mistaken for the Agaricus Campetris are the Amanita phalloides, the deadly agaric, and the Amanita muscaria the more common. agaric, so named because decoctions of it have been used for killing flies, is found during summer along roads, borders of fields, and in groves of coniferous trees. It prefers a poor soil, sandy or gravelly in character, and is only exceptionally found in grassy meadows. It grows singly and attains a large size. gills and stalk are always white. It has a hollow stem, bulbous at the base and clothed with irregular fringy scales on all the lower part. The pileus varies in color from a brilliant vellow to orange or deep red, the first two being more frequent. surface of the pileus is polished and has scattered over it prominent angular warty scales easily scraped off. A large membranous collar hangs down from the upper part of the stem. It loses its brilliant color when old.

The deadly agaric has a white shining pileus without distinct warts, gills which are always white and a hollow white stalk, with a large ring and a prominent bulb at the base, the upper margin of the bulb being membranous or baglike. It usually grows singly in woods and slightly sandy places, and in the borders of fields, rarely in pastures or on lawns.

The Agaricus campestris, or common edible agaric has a smooth white pileus, gills which are first pink then a brownish purple when mature with brown spores, a nearly cylindrical stalk, not hollow, with an annulus near the middle and no bulbous base sheathed with scales or membrane. It is found in pastures. These three speciments have an agreeable taste and the campestris and phalliods characteristic odors. The fly agaric has scarce-

ly any odor. They appear in late summer and early autumn.

The *Pleurotus sapidus* is from 2-8 inches in diameter. The pileus is a dull light yellow to grayish. The gills dingy white, of various lengths and extending down the stem which is short or obsolete, and one side of the pileus. The spores are first white then a pale likac. It has the taste of oysters and its habitat it a tree trunk. The *Pleurotus ostreatus* has white spores.

The *Pleurotus ulmarius* is from 3-5 inches in diameter with pileus a pale buff of yellow and dingy white gills extending down the stem which is of various lengths and off the center. It has white spores and tastes like fish. It grows on the elm chiefly.

The Coprinus or black spore family furnishes three edible species of which the best is the comatus or "Shaggy-mane" which grows by roadsides. The pileus instead of expanding remains the form of a closed umbrella and does not roll outward until it begins to decay when it dissolves forming a black, inky fluid. The pileus is white and covered with large fringy scales. The broad gills turn from pink to black.

The Coprinus altramentarius is conical with a short, stout stalk and ashy black pileus furrowed with longitudinal folds. It grows near dwellings or in the sandy soil of creeks. The Coprinus micaceus is small, not so fleshy as the other two species and has a date or buff-colored pileus. It is usually marked by fine shining particles like mica on the pileus. The spores have a brownish tinge. It grows on old tree stumps or near dwellings.

In the Polyporei or second group of the Hymenomycetes, the gills are replaced by tubes or pores. Among the Polyporei the most important are the great shelf-like woody growths so frequently seen on trunks of trees and popularly known as punk or tinder. The Boletus is probably the most esculent of the genus. The most conspicuous is the *Polyporus Sulphureus*. It is a brilliant sulphur yellow on its lower surface and an orange salmon color on the upper surface. It is a large size and grows in dense clusters on decaying logs. It is esculent in the early stages only.

Of the Hydnei but one species has been reported at Ames, the Caputmedusæ which is a mossy, cream colored, fringy fungus, with long soft spines on the entire exposed surface. Its spores are white. It grows on decayed tree trunks, especially the birch. Season July to October. It has a sweet, aromatic and slightly pungent taste.

Among the best edible fungi are the Morels, which have a hollow, conical top attached to a hollow stem. The upper part has a peculiar honeycombed structure and is cream colored when fresh. The stem is granular when fresh. They appear in the spring in orchards, woods and places recently burned off.

The most expensive and highly prized fungi is the truffle, which grows buried in the soil like potatoes. They are black and

have a warty surface. France and Italy alone produce the valuable species of this fungi, though it is hoped it may yet be discovered in the United States in hilly regions where oaks grow on poor calcareous soil.

The familiar puffballs need no description. All are edible, but the Lycoperdon giganteum and Lycoperdon syanthiforms are

the best.

Until very recently edible fungi were thought to be highly nutritious foods, containing a large percentage of protein and

equivalent to an equal weight of beefsteak.

Experiment stations in this country, German investigators and the Sheffield Scientific School of Yale University have studied the food value and digestibility of mushrooms and occording to their reports the mushroom ranks a little lower than the potato in food value. The total amount of digestible protein is about the same as that of the potato, but since the carbohydrates in mushrooms are much less its food value is less.

The experiments of the Sheffield scientific school showed from twenty-six to fifty-nine per cent of the total dry matter to be indigestible. They contain from seventy-five to ninety-two per cent of water, and since the protein is small they rank with green vegetables. It requires about eight pounds of the *Morchella esculenta*, a fair average species, to supply the necessary protein for the daily ration.

Mushrooms may be served as food accessories on toast, with meats and entrees. They may be baked in white sauce, fried, boiled, or stuffed or creamed. An excellent dish is equal parts of chopped mushroom and cold chicken. Fry slightly in butter, add cream to cover and serve hot on slices of ripe tomato fried. They may be creamed and put into peppers. The Hydmun, Coprinus, and Morels make excellent soups, and from its shape the Morel is adapted to the making of stuffed mushrooms. The Hydmun also makes a dainty dish fried in butter and served on toast.

The puffball is excellent sliced and fried, and also lends itself to stews. The mushroom is used as a condiment and flavor in many dishes.

The canned mushrooms may be used the same as the fresh. When dried, mushrooms should be soaked several hours before

cooking.

The foregoing rules for the recognition of edible fungi are necessarily very imperfect as there are many exceptions known only to the expert, and if the collector is doubtful as to the edible nature of any fungus it is best treated with suspicion. The beginner should avoid all fungi in the button stage, as any with white spore and gills, any even slightly decayed specimens, and those having a bulbous or sheathed base.

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IOWA HORTICULTURE

VOL. 1 AUGUST, 1908 NO. 8

THE VALUE OF FRUIT AS A FOOD.

DR. J. W. FINDLAY, SAC CITY.

Although primeval man was a vegetarian, and by this I mean to include a fruit eater, and the habit of eating meat has been acquired, the latter has exceeded the former in popular favor as a diet, and has become so essential to the human economy that we cannot rationally dispense with its use. Its abuse, however, is to be deprecated and most seriously condemned, for a widespread sentiment in favor of a so-called hearty or nourishing diet of meat has led to intemperate use, as the result of which the human race suffers many unnecessary ills.

An ideal or essential dietary is one which will supply all the elements necessary for the growth, repair and maintenance of the body and its vital functions in a symmetrical way; one that can be adjusted to the various periods and conditions of human life. It is therefore well to remember in this connection that an individual can practically starve to death in the presence of ill-selected plenty, and that ill-selected rather than insufficient diet is responsible in a large measure for the numerous cases of rickets and faulty development in children which come to our notice. We have observed that indulgent parents are prone to allow their children to eat what they want and not what they should have, disregarding the fact that the child's judgment in such matters is totally unreliable and damaging.

To enter into an extensive discussion relative to the chemistry of the body and food stuffs would be a useless occupation of your time. It is only essential that we should know that there are practically but thirteen of the elements incorporated in the human body, and that these elements must be derived almost entirely from food. We should also know that the income of these elements as food supply and the expenditure or eliminations are nearly equal, and that this ratio is maintained in health almost with the precision of a bank account.

These facts simply show the delicate adjustment of nature, emphasizing the importance of most thoughtful care in the selection of food and the quantity to be ingested, and places the problem in dietetics upon a scientific basis, making it possible for its management to be conducted with some degree of precision.

Of the thirteen elements mentioned nitrogen is the most important and should enter most largely into our food supply; for it is the essential in all vital phenomena and without it there is no life at all in the animal kingdom, no, not even in the vegetable world. It is the essential element in protoplasm. That protoplasm is life and life is protoplasm is all we can say, for it is all we know in reference to this peculiar attribute of organic creation known as life. All other elements mentioned are of less vital importance, yet none the less essential to the various parts of the physical economy and belong to a well regulated diet. Without them all malnutrition and faulty development in some direction, as we have said, must necessarily follow.

Again, a substance in order to be a food must not only contain the essential elements, but must hold them in combination fit for digestion and assimilation.

The question therefore as to how we are going to obtain inorganic elements in forms suitable for appropriation as food is a pertinent one for us at this moment, for we cannot digest and assimilate them as found in their native state. Here is the solution of the problem. It is characteristic of the members of the vegetable kingdom that they are able to feed on these inorganic elements, either alone or in their various combinations as found in the soil and gases of the air. This, as we have said, man cannot do. His food must be more highly organized and more complex. His carbon and nitrogen must come not directly but indirectly from the carbonic acid and ammonia of the air. His sodium, potassium, lime, phosphorus, sulphur, etc., not directly, but indirectly from the soil, all through the mediation of plant life which alone can directly elaborate and render these elements fit for our use as a food. We are therefore directly indebted to vegetation, which is idealized in fruit, for our very sustenance; and while other lines of food, of which meat is chief, have their value, yet the products of vegetation evidently lie nearer to Nature's provision for us as a food than all else.

'As horticulturists you will therefore realize the dignity of your labor in striving to improve and produce that which God has so largely used as an investment in supporting man, who is the supreme work of his creative genius.

A moderate amount of meat properly prepared is excellent as an article of diet, for it is largely composed of nitrogen, yet the majority of us eat meat largely in excess of physiological requirements and do not eat enough fruit. We trust too much to the sensation of hunger, to the voluntary choice of food from the standpoint of gratifying the sense of taste which leads to injudicious over-indulgence on the one hand and insufficiency in the proper element of diet on the other. Our stomachs we think

must be full, and our palate, not our reason, the dictator as to what the food shall be.

As the result of a heavy meat diet, which is the tendency of the times, the system is overloaded with nitrogenous elements, and gout, rheumatism, and lithemic diseases in general with all their attending discomforts, as well as constipation, headache, biliousness, etc., are the inevitable results. While the leguminosæ or pulse, of which beans and peas are the most common type in this community, are the most excellently qualified, by virtue of their composition, of all vegetable products to replace a part of the animal food which we eat, for they contain almost every element that is valuable in meat in approximate amounts; yet these same elements in somewhat reduced quantity and different proportions are found in fruit as well. To this we have also an added richness of fruit acids and sugar in the latter which is most useful to the physical economy.

To show the relative nutritive value of fruits as compared with the most concentrated of all food stuffs, of which meat, including poultry and fish as a type, allow me to suggest that the latter contains an average of 60 to 80 per cent of water, the universal solvent, and about 20 to 40 per cent of digestible solids, while the ordinary fruits of this locality contain from 80 to 90 per cent of water and about 8 to 17 per cent of digestible solids.

But no one class of food stuffs can supply all the demands of nutrition even if it contains all the elements of a perfect food, for every class is strong in some elements and weak in others. Fruits are particularly rich in potash, soda, lime, magnesia and iron salts, and also rich in sugar, as we have said, but the small proportion of nitrogenous matters, which is the real tissue builder, makes it necessary to add a moderate amount of meat to the regime in order that a well rounded diet may be obtained.

But to be more specific in reference to fruit. Like everything else that is good, the eating of fruit may be abused, and either an excess, the immature, or the over-ripe fruit may induce a severe gastro-intestinal irritation with resulting pain, from a diarrhœal disturbance. Apples are most digestible when baked, are much less liable to set up flatulency than in the raw state, are somewhat laxative under either condition, and are valuable in chronic constipation because of the large residue which remains to stimulate paristolsis. Ripe pears are better suited to perfect digestion when eaten in the raw state than apples, for their softness and looseness of texture makes them more easily and perfectly masticated. Otherwise their influence is practically the same. Plums, either in the ripe or dried state as prunes, are particularly valuable for their laxative properties, and the lat-

ter, when stewed, make a most valuable adjunct to the daily dieting in case of chronic constipation.

Owing to the small quantity of sugar, not to exceed 4 per cent contained in peaches, they can be used as food with greater freedom than all other fruits of this climate in the treatment of diabetes. Because of richness in alkaline salts, such as potash, soda and lime, the strawberry is peculiarly adapted to gouty and rheumatic cases. These alkaline salts are converted in such a manner in the system that they impart alkalinity to the urine and thus neutralize the excess of uric acid, which is supposed to be responsible for these diseases. The ripe grape is very digestible, and is especially valuable because of its richness in sugar, which amounts to about 14 per cent or nearly double that of any This sugar is utilized in the production of force, other fruit. and its oxidation is therefore responsible for body heat, etc. An excessive use of grapes as a food, however, is damaging. blood, which cannot carry more than three parts of sugar to 1,000 parts without causing diabetic symptoms, is overcharged. The liver, which is the great store house for sugar, is thus engorged, and torpidity, as well as piles, are almost sure to follow.

You will therefore observe that it is not the office of food alone to supply the demands of growth, repair, or dynamics in the sense of body heat, general motility and life, but also to act as nature's medicinal agency in the regulation of organic functions.

To diet does not necessarily mean to abstain from food, but rather to adopt such food as will tend to correct the disability in the same sense that you would administer medicine. Many people are never so happy as when taking something out of a spoon for their ailments, imaginary or real, who would be better and more wisely treated by a carefully adjusted diet and change in habits of living. Too much medicine is sometimes given and not enough intelligent care devoted to these measures which are along physiological lines. Disease does not always mean major ailments such as pneumonia, typhoid fever and tuberculosis, but means any departure from the normal, such as headache. nervous irritability, general depression, dizziness, insomnia, etc., which are as a rule the local outgrowth of faulty eliminations. These ailments are ofttimes amenable to cure in the use of a laxative diet and the drinking of plenty of cold or hot water as a diuretic. It is here that vegetables and fruits find their great usefulness and a meat diet should be restricted.

Faulty eliminations sufficient to cause discomfort just mentioned mean habitual constipation, which, with its usual train of consequences is the bane of mankind, for it is almost universal and its deleterious effects on the general bodily health are far

reaching indeed. In referring to this subject I mean to exclude habitual constipation associated with a wide range of medical and surgical conditions of the digestive tract bearing no particular relation to faulty habits of diet or living. I include only those cases in which there is a lazy inactivity of the muscular walls of the intestinal tract, known as the atonic type, the most common form with which we have to deal. Here is food allowed to remain for an indefinite period in a state of putrefaction and fermenta-The poisons are absorbed and exercise a most depressing influence over the higher nerve centers as well as every other organ of the body. Under the influence of a proper diet the average adult should normally eliminate about twelve and onehalf ounces of feces in twenty-four hours. We believe we are safe in saying that the average individual does not ordinarily eliminate more than three or four ounces during this period, depending for the preservation of health upon occasional complete evacuation by artificial means, or allowing nature to unload the system by intervention of diarrhea. As a result much of the poison of the intestinal contents, of which Vaughan says there is enough formed in twenty-four hours in a healthy man to kill him if all were absorbed, are taken into the circulation by absorption and the usual headache (including sick headache), vertigo, malaise, hebetude, etc., follow as evidence of intoxica-Constinution is therefore a premotion of ill health and should be so regarded.

Now what are we going to do about the matter? The condition has arisen through faulty habits of living, and eating too largely of a concentrated, easily digested meat diet, which furnishes no residue for stimulating the intestinal walls to activity and paristolsis is therefore almost totally suspended. As a result the mind becomes morbid and exacting. Drastic cathartics without limit are taken, and the muscular elements of the bowel are prostrated by their violence. The more drastic and long continued the cathartic, the more aggravated and chronic the condition. As a rule cathartics should only be used to meet some urgent demand in chronic constipation, and also in old people in whom the normal motility of the intestinal muscle has disappeared with the years. Beyond a doubt the more frequent occurrences of chronic constipation in women than in men, is due to their more frequent and careless employment of cathartics. I believe that for the most part it is not medicine we need in the treatment of this ailment when purely functional. That it must be accomplished through the medium of a diet that is at once plentiful and a mixed one. A diet that will stimulate paristolsis; a diet which contains a minimum amount of totally digestible food and a maximum amount of that which leaves a

larger residue, such as fruits in particular, rye bread, cabbage, potatoes, beets, etc., all rich in cellulose, which is unaltered by the digestive fluids and furnishes the desired bulk of residue. Fruit is therefore a physiological laxative of great value, as well as a food of no mean rank.

The import of this paper is simply to enter a plea for a more simple and healthful diet. We are at present much given to habits of eating, which are almost suicidal in character, and it is well for us that the commandment "Thou shalt not kill," does not read: Thou shalt not kill thyself slowly, for we would nearly all be violators of the law.

THE VALUE OF FRUIT IN THE DIET.

ALICE MERRITT.

It is a fact much to be regretted that fruit does not occupy the place which it should on our table. The many popular errors abroad concerning its indigestibility are perhaps partially responsible for its sparing use, and the lack of knowledge of its great value in so many diseased conditions is also responsible for the fact that it occupies so small a place in the bill of fare of civilized nations. In the primitive state of man, fruit formed one of the principal articles of diet, as it still does in some of the tropical countries where many of the natives subsist almost entirely upon the fruit of the date, banana, and similar tropical foods. Most of the fruits, however, do not contain enough of the nutritive constituents to form the staple article of diet. They are rather to be used to supplement the other food. This leads to a general classification of fruit according to its composition:

- 1. Flavor fruits, or those in which very little nutriment is found. This fruit is valued chiefly for its flavor and the acid which it contains.
- 2. Food fruits, such as the banana, figs, raisins, dates, etc. The former class contains a large amount of water (85 per cent to 90 per cent of whole fruit,) the acids and flavors. The water is especially valuable in conveying large amounts to the system, thus relieving thirst as well as aiding the system in throwing off certain diseases. To the acids found in fruit, much of their value in disease is due. Bacteriologists have proven beyond a doubt that pathogenic germs are killed by citric acid. The juice of a lemon is as deadly to germ life as corrosive sublimate, formaldehyde, or any other disinfectant. So powerful a germicide is it, that if the juice of a lemon be squeezed in a glass of water and left standing a short time, the water will be disinfected. This fact is worth knowing, for when it is impossible to get either boiled or filtered water, the juice of a lemon purifies

it perfectly. The same effect is produced by the acids in some of the other fruits. This fact has given fruit a very high rank in the diet of certain diseases. German physicians have recognized this, hence their extended use of fruit juices in fevers, and simi-Before this fact was well known, fever patients lar diseases. were fed of beef tea, bullion, etc. Now this diet is rarely given for it is a medium for bacterial life and the minute destroyers thrive and increase alarmingly in it. On the other hand fruit juices destroy bacterial life and prevent the growth of the germs of disease. The juice of oranges, grapes, raspberries, blackberries, currants or cranberries, may be added to water and used as a beverage in fevers. Used in this way they increase the amount of water the patient is enabled to drink, by giving a distinct and agreeable flavor, as well as killing germs and eliminating the poisons in the system by a slight diuretic action. juices used in the same way are highly beneficial in kidney diseases. The valuable results of a fruit diet in dyspepsia and indigestion are partially due to the same fact that the noxious germs in the alimentary canal do not thrive in fruit juice.

Fruits are the natural correctives of disordered digestion. and to do the best and most effective work should be eaten on an empty stomach or simply with bread. It does not seem to effect the desired results when taken at the close of a hearty meal. The best time to eat fruit is in the morning and it should find its appearance on our breakfast table more than it does. In the morning the secretions of the digestive tract seem to be in an acid state and fruit corrects this. It might be supposed that since fruit contains acid in itself it would only increase the acid in the system, but this is not true. The acids are in the form of organic acids, and are readily converted in the system into alkaline carbonates which are free to neutralize the acids and thus counteract acidity. They are therefore very beneficial in diseases resulting from over-acidity in the system. Acids also improve the quality of the blood by breaking up some of the compounds of waste substances which have been formed and thus increase the secretions. Fruits are especially good for persons of sedentary habits whose livers are sluggish. The acids serve to eliminate from the body the noxious matters which if retained would make the brain heavy and dull or bring about jaundice, skin eruptions, etc.

Fruit is also valuable because of its laxative properties. This property is due to digestible substances, cellulose, seeds, etc. When eaten for this purpose, the fruit should be eaten freely, fresh if possible and as soon after ripening as it can be had. As a general thing canned and dried fruit is not considered as valuable as fresh, although there are exceptions in which the

cellulose is greatly softened by cooking. The modern improvements in means of rapid transportation and method of culture make some variety of fresh fruit possible in almost every climate in all seasons.

The odor and flavors of fruit are due to small quantities of ethereal bodies, some of which form the basis of different fruit flavorings and essences. Although these have no nutritive value, they are not to be despised as stimulants to the appetite and aids to digestion.

As far back as the tenth century medical authorities became very enthusiastic in their writings over remarkable curative properties of different fruits. In more modern times this has been revived and nearly every one has heard of the "grape cure," the apple, peach or strawberry cure. One writer is said to have recommended in special cases eating twenty pounds of strawberries a day. The same writer also cites cases in which maniacs have gained their reason by the exclusive use of cherries. These instances savor of the ridiculous, but there is no doubt that the so-called grape cure for digestion and other evils has resulted in great good to persons trying it. The fruit should be of good quality; if it is not, and the grapes are sour and watery, the patient may be harmed rather than benefited. Apples are said to contain more phosphorus than any other fruit, or vegetable, and it is claimed that this makes them especially adapted to renewing the nervous matter of the brain and spinal cord. Perhaps for the same reason, rudely understood, the old Scandinavian traditions represent the apple as the food of the gods. who, when they felt themselves growing feeble and infirm resorted to this fruit for renewing their powers of mind and body.

Of the food fruits, a good example is the banana. from the date, fig and raisin it is the most nourishing of all the fruits. In its fresh state, it contains considerable carbohydrate, most of which is in the form of sugar, and some proteid. It is, however, too bulky to serve as the main constituent of a healthy diet. It is also dried in the sun and sprinkled with sugar, in which form it has recently been imported. Unripe bananas are also dried and used to produce banana meal or flour. This flour is very easy of digestion, and is used to make a sort of bread. gruel, etc. Another advantage of the banana is the cheapness with which it may be produced. It has been calculated that bananas grown in a suitable soil and properly cultivated are capable of producing more food to the acre than any other plant. When well ripened the banana is very easily digested. Many of the ill effects felt by people in eating this fruit is due to the fact that the fruit is not properly ripened. The dry, green bananas often found in the stores are unfit to eat. It is evident that we

possess in the banana a source of cheap nourishment which may one day be of great importance.

Dried fruits, as dates, figs, and raisins, surpass even the

banana in nutritive value.

Thus from our study of fruit we find that it should not be regarded as a luxury but as a valuable addition to the diet. If more fruit and less animal food were eaten, the body would be kept in a more healthy state, and our doctor bills would be much less. Instead of resorting to the use of medicine for correcting disease, let us, whenever possible, use the methods which nature has provided for her children.

PROCESS OF PRESERVING FRUIT FOR HOME USE.

MRS. J. R. WALLER, ROCKFORD.

Since we live in a land where the dormant period of vegetation covers so large a portion of the year, the time of fresh fruits, other than imported, is quite limited. Therefore it is very desirable that the provident housekeeper should prepare by cooking, an adequate supply of fruit for our long winter season.

To assist us in this work, excellent and abundant directions and recipes abound, and are easily accessible to all, but perhaps, like the ten commandments, an occasional rehearsal of some of them may be beneficial.

The processes by which the wholesomeness and flavor of the fruit are most perfectly retained are certainly the best methods. The first requisite is that the fruit should be of best quality, and in best condition for best results in preserving, but under-ripe or over-ripe fruit, which is not wholesome uncooked, is rendered more healthful by cooking. It is said that dried fruits are richer in nutrients than fresh, juicy fruits, but they lack the refreshing qualities of the latter. Some fruits require very little sugar in cooking, while others are more satisfactory with a generous amount of sugar. Some of the fruits which require a considerable quantity of sugar, are strawberries, cranberries, plums, tart apples, currants and gooseberries, while of those which are better with less sugar, are raspberries, blackberries, peaches, pears, quinces, etc.

The color, flavor and tender texture of nearly all fruits, are better if the sugar is added when put on to cook.

Hard fruits, such as quinces, must be made tender in clear water before sugar is added. The more lightly fruits can be cooked, the better they retain their natural flavor. In canning, perfectly sound and fresh fruits may be put up with or without sugar, as that article is not essential to their preservation, but sometimes causes fermentation.

No preserving powders of whatever name should be used. Anything of the kind that will prevent all fermentation in fruit. must also prevent its proper digestion. In view of the ever present yeast plant and bacteria, which fill the air and menace our success, we cannot be too careful in preparing cans, tops and rubbers, sterilizing, heating so thoroughly as to destroy anything of the kind that may fall upon them from the air. No reduction of this high temperature should be allowed until the jars are safely sealed, or our painstaking will be in vain, like that of the absent-minded professor who carefully rinsed an apple in a glass of water to remove any possible bacteria, and after eating the apple drank the water. After the fruit is carefully looked over. washed and placed in the jars with rubbers adjusted and lids loosely on, place the jars in a flat-bottomed kettle, on an inverted tin plate (or use wash boiler for larger quantity), fill the kettle with cold water to about two-thirds the height of the jars, cover and boil ten minutes from the time beginning to boil for small fruits, for large, fifteen minutes. Two jars may be filled from a third after condensation. Fill to overflowing, as the liquid condenses in cooling, leaving a space at the top of the jar. A widemouthed funnel facilitates the filling. Lift the jars one at a time, fasten the tops, wipe off and stand in a cool place over night. If inverted any defect in sealing will soon appear. When cold, if using screw tops, try each one to see that it is perfectly tight. Keep in a cool, dark place, as sunlight is considered injurious to the flavor of the friut.

When sugar is used, a cupful to a quart can be dissolved in sufficient water to make a syrup, and pour boiling hot water into jars before removing from the kettle, is a very good way, or syrup may be made in porcelain lined kettle, cooking enough fruit at a time to fill two or three jars. Fill one at a time, taking each jar with rubber adjusted from scalding water and quickly fasten the top which is taken from boiling water. For either canning or preserving, all pared fruits should be thrown into cold water to prevent discoloration. In the form of preserves more sugar is used than for canning, making a richer syrup, though the old rule of pound for pound is not necessary to keep the fruit since the invention of sealed jars.

A standard authority gives the following recipe for preserving peaches: When a sufficient quantity is prepared to cover the bottom of a porcelain kettle, weigh, and to each pound of fruit allow two-thirds of a pound of sugar; put the sugar into the kettle, on top of it the peaches. Heat over a slow fire until the boiling point is reached, then cook gently until transparent. Lift

carefully and put into tumblers or jars. Boil down syrup, cover over and seal. All fruits may be preserved in the same fashion, using from one-half to one pound of sugar according to the fruit. Another general rule is to make syrup of water and the amount of sugar desired, place over the fire, and just before it boils stir in the white of an egg beaten lightly, with two tablespoons of water; as it begins to boil remove the scum with care, boil till all scum is removed, then add the fruit.

Fruits for jellies is best a little underripe, always freshly picked. Some kinds of fruit do not easily form jelly on account of a deficiency of pectose, the principle which causes juice to thicken when it is cold. Peaches, pears, cherries, mulberries, huckleberries are of this class. The pound for pound rule is not necessary for many fruits. For quinces, currants, crabapples, cranberries and green grapes one-half pound of sugar to a pint of juice makes a much better jelly. Small fruits may be mashed and drained in a jelly bag over night; large fruits cooked in water till tender, then drained in the same manner. squeeze for best results. Measure juice, bring to a boiling point, skim, add sugar and boil rapidly till it jellies. This may require twenty minutes or only five. After five minutes begin testing for the jelly point. Dip out a small spoonful into a sauce dish and cool. If it thickens and wrinkles, your jelly is done; if not, keep on testing constantly, for if cooked beyond the jelly point it will never be anything but syrup. When done pour into tumblers, let stand a day or two slightly covered to dry the surface, then tie paper over, or paraffine wax may be used to cover jellies. as well as marmalades and other sauces.

Our wild plums may be prepared in a variety of ways, but whether for canning, preserving, marmalades or jelly, are much improved by a preliminary cooking in saleratus water till the skins burst.

I prepare my plums by the same process.

PLANT ADAPTATIONS.

R. E. BUCHANAN.

It is impossible in a paper of this nature to treat in an exhaustive manner a subject that is so broad, concerning which so much has been discovered, and in which there is still such a large field of uninvestigated problems, as Plant Adaptation. I can only attempt to direct your attention to a few of the many points of interest, especially those that seem to be of economic importance to the horticulturist and the farmer.

Let us first consider what plant adaptation means. In the broad sense, every portion of a plant, each peculiarity of form

and function, is an adaptation to some of the needs of that plant. These adaptations may well come under two headings, the specific and the general; that is, some eccentric individuality of a single plant, an undoubted adaptation to existing conditions, is hardly co-ordinate with the long process of evolution. Plants are on every hand exposed to dangers. These are of many types, according to McMillan, usually some of the following: dessication, inundation, fracture by wind or water, poisoning by salts, over and under illumination, overheating and cold. On every hand we meet with these adaptations to offset the rigor of adverse conditions or to use them for the benefit of the plant. The infinite variety in the form and color of our native flowers, from our golden buttercup with its simplicity to the extremes of form. color and adaptation of the orchids on the one hand and the asters and the sunflowers on the other, all fitted for cross-pollination and fertilization through varied agencies; the viscid glands of the petunia, the hairs of the mullein, the scruf of the Oleaster, the plumes of the thistle and the dandelion, the bright colors of fruits, these and a host of other plant characters are more or less perfect adaptations to existing conditions. No plant, however, has attained to perfection. One passing through our woods this summer and fall could hardly fail to be impressed with the multitude of fungi growing on every side upon the trees.

To say that a plant is well adapted to certain conditions is to say that it has been modified by its environment into its present conditions. One of the most important of the botanical and horticultural problems of the present is that of the modification and adaptation to climatic conditions. Here we have locked up the whole subject of acclimatization, about which so much has been written, and concerning which so little is really known. The question of why one apple tree is hardy and another is not is certainly a question of adaptation, yet the facts in regard to the factors at work are hard to grasp. It may be of interest to note some of the more evident influences of climate on plant life. Vegetation attains a maximum of luxuriance where there is plenty of heat and moisture, but Iowa climate possesses neither of these in the proportions best suited for plant growth. Our climate possesses neither of these in the proportions best suited for plant growth. Our climate is, on the whole, rather dry, and we find many plants that are adapted to this condition. We have not the amount of heat and drouth that the states to our west experience, nor have we as much moisture as the states to the east.

Let us examine some of the most interesting of these adaptations to the different climatic conditions. Coville has given a very good account of the vegetation of extremely dry climates as typified in that of Death Valley in California. He says: "It is probable that the combined amount of foliage produced by all the shrubs on an acre of desert surface is not greater than that afforded by a single tree of the ordinary humid region type.

* * Only so many individuals grow on a given surface as can be supplied with moisture from it. * Desert Shrubs essentially present in their environment the anomaly of a struggle for existence, not against each other, but against inorganic physical forces alone."

"The first theoretical necessity of a plant is that the water it absorbs from the ground shall practically equal, in amount that which it transpires." There are two ways of accomplishing this end, that is, of regulating the supply and demand—first, by the reduction of the amount of transpiration by some means, or, second, by an increase in the amount of the absorbing surface. One most efficient means of reducing the transpiration is by reducing the transpiring surface. We have all gradations in the amount of this reduction, in some plants appearing as a decrease in the size of the leaf, the stem becoming thicker in proportion and taking to itself many of the leaf functions. In the cactus, particularly the globe cactus or Mammilaria, we have no foliage leaves developed, their functions having been usurped by the thick green rind of the plant or stem. The sphere is the solid of least surface, so here is the minimum of transpiratory surface to a given volume. A modification well worth noting is that which these desert plants undergo when brought gradually into a moist climate. Some of the Mexican cacti, for instance, have adopted a life in the damp woods of that country. Then tendency is to increase the transpiratory surface, but the leaves have disappeared as This increases the number of leaves and the area of leaf surface. Instead, the stem flattens more and more until in some of the species there are developed organs that exactly resemble leaves superficially, yet are not morphologically such. Many of these dry region plants protect themselves by early dropping their leaves, as in the case with the Crown of Thorns (Euphorbia splendens.) Often, too, the surface of the leaf is coated with a covering as in the Bigelovia, (Rayless Golden-rod.) Almost universal is the production in such climates of a thick cuticular layer. This cuticle is of service not alone to desert plants, but the many others in many ways. Beside diminishing the evaporation of water, it is effectual as a check to fungi and to the depredations of the smaller insects. Bain of Tennessee has found that the injurious effects of fungicides upon leaves is directly as the thickness and the density of the cuticle, other conditions being the same. It is a well known fact that apple trees rust badly in the eastern states, while in Iowa even the most careful infection experiments generally fail to produce the disease. Since in Iowa

we have a much warmer and drier climate than in the east, it is probable that our Iowan apple leaves have thicker cuticles, and are thus better protected from the disease. Then, too, the smooth glossy upper surface of many of the leaves does not permit the water to cling to it, and so does not furnish an opportunity for the germination of fungus spores.

Hairy coverings are invaluable to many plants in checking transpiration. The vegetation of most dry regions is of a grayish cast, every plant being clothed with a dense close covering of hollow hairs that hold the air from freely circulating about the water pores and stomata in the leaf, and thus prevent undue loss of water. The cultivated oleander goes still farther, it sinks its stomata in pits, and then fills the pits with hairs, this on the lower or shady side of the leaf while the upper side is thick skinned and glossy, and without stomata. Plant hairs protect from the cold as well as the heat. Our common mullein in the first year of its life has a rosette of woolly leaves that live through the winter. The hairiness does not prevent freezing, but does prevent rapid alternate thawing and freezing. Moisture is as difficult of retention in the winter and the cold as in the hot dry days of mid-summer. It frequently happens that a dry winter is more disastrous than a dry summer. Evaporation continues without any chance of the tree receiving a sufficient supply of moisture from the earth.

These plant hairs may function in many other ways than preventing too rapid transpiration. As glands in the tomato, petunia, tobacco and many other plants they secrete substances which are offensive to most insects and animals. Some are metamorphosed into stings, as in the nettle, or spines as the gooseberry or thistle, effectually insuring that they will be left alone by all animals. Some plants, as the monkshood and nightshade, secrete poisonous principles that effectually prevents their use as food by animals. Some of these plants are the greatest enemies that the stockmen of the west must contend with.

Our common Compass-plant or Rosin-weed shows another adaptation. To reduce the intensity of the light, the leaves are set approximately in a vertical north and south plane. The leaves of many of our grasses are provided with certain cells that cause the leaf to roll in the absence of moisture.

Aromatic substances of many kinds are produced by desert plants. Coville thinks that these are of material assistance to the plant by surrounding it with a layer of vapor that materially decreases the penetrating power of the sun.

Many other adaptations occur in plants with climate as the modifying factor. Those plants adapted to colder climates are dwarfed. Maize that averages over twelve feet at the gulf is not over six in Canada. This dwarfing does not mean a diminution in the amount of fruit produced, for most plants reach a maximum of fruit development in climates colder than those of maximum luxuriance. Many examples might be cited of this dwarfing effect. The willows that grow to the size of trees in this climate, are replaced by shrubs in the higher altitudes and latitudes, and in the far north and on the mountain peaks by species growing only an inch and a half high with perfect flowers and fruits. Northern plants are believed to produce larger and better seeds. This, together with the increased vigor that a change of climate often confers upon a plant explains why northern grown seeds are supposed to be the very best.

Fungous diseases are one of the most serious enemies to plant growth, accordingly there are many adaptations for the prevention of such. Plant tissues rich in water, with thin epidermis, or in a state of rest are especially liable to fall a prey to these fungi. Oat-smut can only gain an entrance at the growing point of the young germinating plantlet. When a plant is wounded the cells immediately below the wound take on the special function of producing cork, and healing the wound. The ability to accomplish this quickly is one of the best safeguards against the introduction of parasitic fungi, as in the apple scab fungus.

The extremes of adaptation are to be found in that most specialized of plant organs, the flower. Cross pollination and fertilization in the plant world is a most fascinating, as well as interesting study. Cross fertilization in our cultivated plants must be recognized as a factor of the utmost importance in securing vigor and hardihood. Any special adaptation to this end is often of the greatest value to the horticulturist. Dr. Gray says—"When Mr. Darwin announced the principle that cross fertilization between individuals of a species is the plan of nature, and is practically so universal that it fairly sustains the inference that no hermaphrodite species continually self-fertilized would continue to exist, he made clear to all who apprehend the principle that a series of plants propagated by buds alone must have a weaker hold of life than a series reproduced by seed."

The reasons why one plant is hardy and another is not, the whole question of plant modification and mutability, are of prime importance to the practical man whenever and wherever, he comes into contact with plant life. Sometime it may be that rules for the recognition and acclimation of plants may be had, but at present there are many puzzling theories and ideas, yet as time passes the question of plant adaptation takes on a more tangible form. It remains for the future to unravel these mysteries and contradictions and make a right use of this great store house of fact to aid man in his efforts to provide for himself.

The Editor's Page.

A summary of the reports for August on the condition of the fruit crop in the state gives the following percentages: Summer apples, 32 per cent; fall apples, 35 per cent; winter apples, 28 per cent; peaches, 33 per cent; Americana plums, 20 per cent; domestic plums, 21 per cent; Japanese plums, 24 per cent; grapes, 65 per cent of a fully crop.

The apple crop in Iowa is about the same as a year ago, about one-third of a full crop. The best yield will be in the eastern part of the state. The apple crop in the Mississippi valley is short. The Pacific coast states report a good crop. The indications are that the crop throughout the country will not be more than ten per cent larger than that of a year ago. Good apples will find a ready market at satisfactory prices.

* * *

How do you regard the windfalls in your orchard? Are they full of worms, or have they crawled out to continue the work of destruction in a later brood? Do you know the codling moth when you see it? The orchard is the best place to study the habits of this insect. You can never use a remedy effectively until you know just when it should be applied to do the most good. When you know your enemy thoroughly you will soon be master of the situation.

. . .

When the Colorado beetle first invaded the potato patch it brought consternation to the cultivators of the tuber; but now that they are familiar with its habits and know how to destroy the larvæ they do not longer regard it as a menace to the potato industry.

As the urban population increases there will be a greater demand for good dessert fruit. Good apples to eat at this time of year have never been grown in excess of the demand for them, but the supply of culinary fruit of inferior quality has frequently been greater than the market could carry without loss. Such varieties as Early Harvest. Early Joe, Benoni, Chanengo, Primate, Red June, Williams Favorite and Dyer, though the trees are not long lived west of the Mississippi river, are still worth planting in southeastern Iowa, in the family orchard, for home use, and the surplus fruit, if put into neat packages,

will always find a purchaser at good prices. The small sized grape basket makes a convenient package for these apples in the retail trade. The fruit should be carefully picked and only those specimens selected that are free from worms, scab, bruises and other blemishes when they are to be served at table. The demand for this class of fruit has not been fully supplied. The standard is high and to comply with it requires skill on the part of the orchardist, but excellence is not without its reward and the man who can supply it will find a ready sale for such fruit.

"Effect of environment" has often been a theme for discussion; it is pregnant with suggestion. As an instance let me cite a case where two men, each with a pig at command; one of them had so environed his "porker" that at the end of nine months it tipped the beam at 400 pounds, while the one owned by the other man could scarcely raise 200 weight. Why this difference, and who is responsible for it? Possibly the digestive capacity of one pig was not equal to that of the other, but the usual verdict would be that the man who had the fattest hog gave it better attention than the other man did his. principle applies all along the line of horticultural production. The man with scraggly trees of stunted and forlorn aspect, the fruit knotty, wormy and deformed; with vegetables that are tough and stringy, ought to inquire of his inner conscience why they are so, before he commends the whole outfit to the other world. Comment is unnecessary under the premises.

If you want fine specimen bunches of grapes study the subject of summer pruning. Direct the energy of the vine toward making what you want instead of letting it have its own way. Culture in the broadest sense means the development of the best that is in plants or men. Be a culturist with that thought in mind, and the improvement in self will be in proportion to the energy exerted in trying to improve that on which you are at work. Culture has a reciprocal influence on the cultivator as well as the thing cultivated. What an uplift of soul comes from living in touch with the best that grows in fruit or flowers as well as with men. To have such aspirations is a pardonable vanity, if not a laudable ambition.

FOREST PRESERVATION IN IOWA.

CHARLOTTE M. KING.

"Who plants a tree plants hope." That trees fail of general appreciation among us is emphasized by the unsheltered streets of our newer towns, and by the ill pruning of trees everywhere evident amongst owners of timbered lands. There is frequently lacking that spirit which will make something of personal sacrifice of immediate returns for that more generous act of beautifying the country by increasing its store of beauty, and by giving it cumulative future resources.

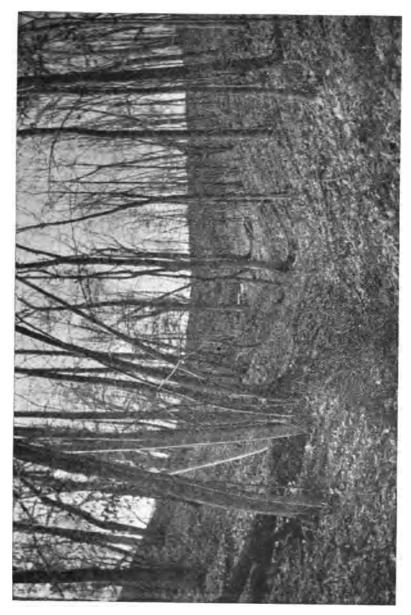
Then sentiment which shall foster forest preservation must spring from realization that the beauty of trees and woodland is worthy of preserving, and from knowledge of the utility of this valuable resource, the forest. The cultivation of this sentiment is a matter of education.

The mercenary spirit which necessarily dominates men's actions is much more alive to the availability of land to sustain numbers of hogs and cattle than to the use of saving a valuable woodland upon the territory in natural conditions.

To have forest culture possible, then, requires the encouragement of both public and private reserves; for to offset this apparent advantage in double use of land, is needed state encouragement of private owners.

The making of our forest has been a slow but sure contest against the domination of another type of plant life, the grasses. The streams with their attending springs and exposures of waterbearing strata, have furnished the foothold for forest types. These, left to themselves, make their own conditions suitable, and prepare their own way for further extension inland from the streams. The woodlands of Iowa repeat the story of the streams with regard to location. The forest can bear a good deal of letting alone. The care man can appropriately expend upon it is of two kinds; first, in reducing unfavorable conditions, as presence of insects, extension of fungi and crowding of the trees; second, in making intelligent choice in his lawful levyings upon the woods, of the trees to be removed. Much care and foresight is needed in the choice of the time to cut a tree; there is the double problem of maximum usefulness to the owner, and minimum loss to the forest.

The unmaking of our forests is carried on in many ways; by wholesale cleaning of wooded territory; by indiscriminate selection of trees to be cut, with reference to the needs of their neighbors for light, air and protection; the destruction of birds; the destruction of the forest ground-covering in many ways, as in use of the woodland for cattle and hogs; in the removing of the sheltering undergrowths.



BASSWOOD (Tilia americana) IN SPRING.
Photograph by Charlotte M. King.

Perhaps there is some direct relationship between the destroying of natural conditions and the succumbing of many of our forest trees so apparent in recent years. Perhaps, what we term "effects of extreme seasons" upon our woods may be better expressed in terms of their mistreatment.

There is in central Iowa, a strip of timbered country worthy of preservation as a reserve. Here are united the common types with some unusual ones from northern woods. On steep slopes with a northern exposure we find groups of white pines that during the lapse of years have raised their summits to the height of fifty to eighty feet; birches, basswoods, hornbeans, ironwoods and poplars have thrived beneath, while every ravine shaded area has been rich with ferns and mosses. On the bottom lands still abound elms, locusts, and oaks with their undergrowths of hazel and various other bushes and shrubs. The hillsides are thickly wooded with various oaks, poplars, shadbush, hickory and frequent vines and shrubs. The locality is especially suited to trees on account of its moisture. Juniper and leatherwood occur. There are many rare plants, as shade-loving gentians, the large, pink moccasin flower, the bush-honeysuckle and some unusual ferns. These should not be allowed to perish from the region.

The vegetation along the Iowa river at this point is so varied and interesting that it should be safe from the usual destructive inroads; but one cannot fail to be impressed by the evident lack of consideration of any kind, which is being directed toward saving these woods. There is hardly an acre of this country left that the cattle ranch has not invaded, on slopes where undergrowth and low plants have held the soil, browsing and trampling have frequently uncovered the ground and the surface is rapidly washing. Under the large pines, birches, oaks and elms and throughout the woods the same agencies are compacting the soil and removing the shade, destroying at once the seedlings and their protecting neighbors. Wooded ravines have become the retreat of cattle in hot summer months, and their presence is testified to by the removal of vegetation. Everywhere the woods are being deprived of their leaf-mould and left in a much drier state. Many acres in this vicinity, a few years ago that were covered with thrifty forests have been denuded by wholesale cutting, and only here and there, a hard maple is left. The hills lie bare beneath the summer sunshine, and the grasses have once more taken possession. Nowhere is there any evidence of regardful care toward the woodland. This is but one instance, used for illustration, of a condition we see in every part of the state. Our forests vanish leaving only the straggling and dismantled woods to strive in useless resistance against the inroads of domestic animals, and the man "with the ax."

Here is one opportunity of restoring and maintaining a fineforest, possible also in many counties of the state. Nature will resume her planting and tending if given a chance to do so. Let us hope some measures of forest protection may be put into effective work soon.

Why may not the American people cultivate that tree-loving spirit prevalent in many of the older countries where a forest is not only a valued and resourceful possession but contributes to the people's lives in many helpful ways.

THE EDUCATIONAL EFFECTS OF THE BEAU-TIFUL IN HORTICULTURE.

W. M. BEARDSHEAR.

The philosophy of education now concludes that the beautiful or the perfect is fundamental to education and civilization. One of the best things of Grecian learning was their identity of beauty and goodness and their maxim that only the beautiful is good. In modern times Herbert treats morals as a part of the beautiful. Beauty is spiritual and subjective as well as formal. You remember what a run E. P. Roe's "The Face Illumined" had among common readers; how its chief character was a young girl whose face had much of a formal beauty but little of a spiritual. Through the processes of trial, responsibility and education that face became illumined and the inner truths of the soul pictured themselves upon her face in the handicraft of heaven. Beauty is primarily a product of the reason and this accounts for the clarifying of souls and the brilliance of eyes. under the awakening of larger souls, whether in the flesh or in the tree, for

If a man as right and true might be As a flower or tree! I would give up all the mind In the prim city's horde can find House with its scrap-art bedight, Straightened manners of the street, Smooth-voiced society.

So that not only in horticulture but in all the field of learning the beautiful is fundamental to the truest and highest education.

Among the most pleasing acquaintanceships of school days were the books teaching that nature has reasons and aims. It seemed like the discovery of some old manuscript of the scriptures hidden away in the archives of nature's centuries. Uncovered to our eyes it was the beginning of

Knowledge never learned of schools.

The old orchard, even in the fall time, with its unique reds and yellows of trunks and branches, with its encasings of the buds for the winter in fuzzy particles and oily consistencies, in delicacy of workmanship and beauty of design, seemed a revelation of God. An overgrown fence row or an old thicket became a study of deepest interest by reason of these endful provisions which became as "the rocks for the coveys," a refuge in danger. The roots of these thicket growths with their marvelous branchings displayed a beauty underground rivalling that above. The hackberry and the elm trees spread their long roots near the surface of the earth and surprised you by coming up away off in unlooked-for directions. The walnut and wild cherry sent a long tap-root earth's centerward, growing the body of the tree into the earth as well as above the earth. The sturdier species of oak gave the secrets of their character with something of the composite energy of the maple, the walnut, the cherry and the beech in the diversified out-reaching of their rootings in the earth.

Who can approach an orchard in the spring-time, with its birds, bees and blossoms, without feeling another higher world. If hope never sprung eternal in the human breast it would in such an environment. An apple tree in full bloom is something God made to make a man feel in his own soul. The exquisite coloring fills the eye, the fragrance delights the sense, the bloom awakens the emotions, and the scene, once saturating the affections and the emotions, is a spectacle never to be forgotten. I remember a few such trees that to this day move me to tears and noblest emotion. One was in the old homestead orchard. Its branches had a big trend northwestward and its flowering was honey and apples in bloom. It has long since died with the good old friends of the boyhood neighborhood, but its life, like theirs. lives in a memory of perpetual benediction. The other is a tree, whose scions came from afar over mountain and ocean, whose trunk and branches are a poem God-endowed with flowers. In its presence my life leaped with the thrill of an unspeakable ecstacy which left a mental flavor that enwings the soul to this day.

> I would that thus, when I shall see The hour of death draw near to me, Hope, blossoming within my heart, May look to heaven as I depart.

What a heaven's entry way is a forest of trees. With majestic proportions their branches form innumerable triumphant arches, under whose living folds the beholder can walk in wonder and ennoblement. They speak a thing of utility and poetry. Their shades surpass the cooling shadow of the psalmist's rock

in a weary land. A forest in spring is a mind path of the beautiful, a soul's inspiration from the Most High and a stenography of holy writ in trees. When an object surpasses our comprehension there is suggested the idea of the absolute, and in this consciousness there comes to us the ideas of sublimity. The magnitudes and magnanimities of the woods surpass our comprehension and fill the mind with feelings of awe and sublimity. Bryant says:

Thou wilt find nothing here
Of all that pained thee in the haunts of men
And made thee loathe thy life.

Miss Wedgewood has said in her book on the "Moral Ideal:"
"Not the criminal code but the counsel of perfection shows us what a nation is becoming, and he who casts on any set of duties the shadows of the second best so far as he is successful, does more to influence the moral ideal than he who succeeds in passing a new law." In the forests a man sits under the counsel of perfection and casts on his duties the shadows of a second best.

The educational effects of landscape gardening are unlimited. All the beautiful aspects of nature await the thought and skill of a landscape gardener. Men's mental imagery is formed out of the bits of his previous ideas, ground like potter's clay, ready for any conceivable mold, but a landscape has the possibilities of the limitless aspects of nature in hills, fields, forests, shrubs, flowers, water and sky. Once in awhile there is a master with a brush in art. Once in a greater while there is a master with a spade in hand to re-image the hills and fields, the trees and shrubs, the flowers and sky, in the landscape, whose language will be in moving pictures of beauty and grandeur. When a man goes into a city he brushes his hair, manicures his nails, adjusts his clothes and straightens the kinks out of his back. This is largely an operation from without inward. But when he goes into the presence of a beautiful landscape his soul lifts his body to graceful poise while his mind thrills with loftiest emotion. This is a motion from within outward, unfolding the being in largest existence.

There is a holy contagion in a well kept lawn, with tastefully painted trees and shrubs. A few well kept lawns in a town will lift the lawns of the adjoining neighbors. While in Washington, D. C., a recent summer, the force of the newer improvements and the close neighboring of people in radically different classes impressed me. On one corner lived a member of the president's cabinet; on another, opposite, a prominent journalist. Diagonally across from both, on a triangular lot, an old-time negro shanty still survived the progress of the age, but it had caught the higher consciousness of its environment. The brick and the tin cans were more carefully taken from the

yard; the whitewash was whiter and the rope on the goat better than similar shanties farther away, and abstracted from the consciousness of this higher spirit. The mental uplift of spirits is in a man's dooryard, as well as in his eyes. This equation of lawns and dooryard is not an idle speculation, but an inspiring possibility in landscape gardening.

.What perfection heaven has put in fruits! What a marvel of beauty is a tree filled with ripe cherries, or with ripe apples? A well-formed apple must please the eye of a god, let alone a human being. It is the choicest pendant by which God ever begemmed the crowning of a tree. It is graced with curves which are acknowledged to be the most essential lines of art. colorings of all the Indies harmoniously blend in its beauties. The bloom of spring-time, the music of sweet-throated birds, the plays of happy children, the dews, the rains, the sunshine and the aroma of earth have all enbirthed themselves in something called an apple. What shall we say of the ideals in the berries. the multiform gems in currants, the various enlinings of the gooseberry, the pyramidal royalty of the strawberry, and the composite storecells of the raspberry and blackberry? When Walt Whitman said a "Running blackberry would adorn the parlors of heaven," he must have had in mind when it was in fruitage. Then there is a damask and cerulean hue of the plum and the tropical delicacy of the peach. An environment of model fruits is a liberal education.

The delicacies of the tastes and flavors of fruits are among the subtly refining elements of our natures. Taste is to refinement what tact is to judgment, the instinctive mental touch of things. A pleasant taste is a bouquet of all the senses in an exalted comradery. A bad taste is a quarrel of all the senses in disgustful rebellion. The flavors of pleasant fruits exhilarate soul and body. A good taste is the soul in judgment over the translations of matter to nerve and nerve to thought. Delicate tastes are marks of high born souls. John Ruskin said "Taste is not only a part and index of morality; it is the only morality. The first, last and only trial question of any living creature is, what do you like? Tell me what you like and I will tell you what you are." This is true of judgment of fruits as it is of judgment of customs. The flavors favorite to an individual portray much of his inner self. The poet Akenside starts the query :

What then is taste but thought's eternal powers Active and strong and feelingly alive To divine impulse? A discerning sense Of decent and sublime with quick disgust From things deformed or disarranged or gross In species? This nor gems nor stones of gold Nor purple state nor culture can bestow But God alone when first his active hand Imprints the secret bias of the soul.

FURTHER NOTES ON THE DEWBERRY.

I. N. STONE, SIOUX CITY.

The question comes to us located here in the northwest with much to contend with in growing any kind of fruit; will it pay to grow the dewberry here for market or for home use? Is it productive enough to take a place alongside of our best varieties of strawberries, raspberries, blackberries and grapes? A wide difference of opinion exists in regard to the value of the dewberry as a profitable fruit to grow here for market. Undoubtedly the testimony of a majority of those who have planted any variety of dewberry would be that it is not a profitable berry to grow, while some can say decidedly that it is.

If I were to answer these questions from twelve years' experience here with all of these kinds of fruit, I would be obliged to say that the dewberry has given me more profit on the same

area than any of the other kinds mentioned.

The dewberry is comparatively a new fruit under cultivation and there are but few new kinds of fruit which succeed in all parts of the country, with all kinds of care, and the dewberry has had its share of mismanagement. Many get discouraged with it on account of its being a small plant to start with and because it does not produce much fruit the first year or two, but it is more sure to grow when transplanted in productiveness for the first six or seven years and continue bearing good crops twelve or fifteen years without resting. It will succeed well in a loose sandy or gravelly soil, and will do well in a heavy soil if not too wet. The trailing habit of the dewberry canes renders them easy to cover where winter protection is necessary, and our sweeping winds do not injure the vine or fruit and its fruiting capacity seems not to be affected by heat or drouth, even when strawberries, raspberries and blackberries are ruined by drouth.

The dewberry is of the blackberry family, but has a more sprightly flavor; is larger, ripens earlier, and is considered by many to be far superior to it, either fresh from the vine or when canned, in fact many think its quality is improved by canning.

The dewberry is propagated naturally from tips, but may be grown from root cuttings, I consider the tips much better to plant for a permanent plantation, as they will give a broader crown to the hill and much more root power than a plant from a root cutting or a sucker plant.

My experience has been mostly with the Bartel and Lucretia. I prefer the Bartel on account of its productiveness and good quality of fruit. Another point in its favor is that its canes have scarcely any thorns, while the Lucretia has many very savage ones which will even pierce through a leather glove.

Dewberries should be transplanted in early spring. Plant three by six feet and cultivate shallow one way only, with a horse, using a hoe between the plants in the row. The first year we can cultivate close to the row regardless of the canes as the cultivator will turn them without injury so they will grow alongside of the row. After the first year the canes should be cut back during the growing season to within a foot or two of the center of the hill. It will be necessary to go over the vines several times during the growing season in order to prune the earlier and later starting canes to the proper length.

All varieties need winter protection here in the northwest to insure a good crop every year. Just before the ground freezes the canes should be placed alongside of the rows, and if there is old mulching on the beds it should be placed over the hills so that by putting a few inches of mellow soil on the canes they will be pressed to the ground. After the mulching has been placed on the row it is ready to cover with soil, which can be done mostly with a bright plow by turning a light furrow on to each side of the row; it may be necessary to use a shovel to dress up some hills. It will pay to use mulching under the bushes during the summer, even where winter protection is not needed, as it will keep the fruit clean and by applying it over the whole surface in the fall, it will do double duty, by adding to the winter protection.

In the spring, work the canes up through the mulching with a fork or potato hook, and move the mulch from between the rows, placing it along the row and under the canes, leaving the plantation so that it can be cultivated one way only. Do not uncover, the first warm spell in the spring, but leave until they commence to grow where the canes come near the surface.

Success in growing the dewberry in this northern locality depends on following out the above mode of treatment in detail. and at the proper time, but success here depends more particularly on the one point which is almost sure to be omitted, namely, summer pruning. If the dewberry is left unpruned during the fore part of the season it will send out slim canes eight or ten feet long, and the fruit buds will be formed near the terminals, at the end of the growing season, and there will not be any fruit buds within three or four feet of the hill; then, if the canes are cut or frozen back in the fall or winter to within three or four feet of the center of the hill, there will be no fruit buds left for a crop. but if the new canes are kept cut or pinched off the fore part of the season, when they get to be one or two feet long, the fruit buds will form in close to the hill, and even if all of the terminals should be injured by the winter there would still be enough fruit buds left for a good crop of fruit. I have had hills eight

years old, grown from tip plants, which were systematically summer pruned, with the terminals of all of the canes killed back one-third by the winter, and a six weeks' drouth preceding the ripening season, which still produced four quarts of fine berries per hill, which lay close about the center of the hill, showing the berries in their different colors of ripening and in the form of a mound, which could have been covered with a bushel basket turned bottom side up.

The dewberry has the root power, and the top can be systematically trained so that it will succeed well here in this northwest prairie district. While it might be successful in the south with less care, it will not be a profitable fruit to grow here, if not given proper management.

HARDY SHRUBS AND HERBACEOUS PLANTS.

HENRY LAU, DAVENPORT.

In this age of progress, the average resident of the Hawkeye state is no longer obliged to content himself with what is strictly necessary, or even useful, but he can afford to enjoy, within proper limits, that which is merely ornamental. Accordingly, he keeps fine horses and stylish carriages, buys pianos and erectsfashionable dwellings. These, to look their best, should be set off with appropriate surroundings; a smooth lawn, some tall shade trees, shapely evergreens, and last but not least, the bright touches of color furnished by the floral kingdom.

The desire for these things is becoming more general; many would like to have them who cannot find the time that is necessary to take care of them properly; this is more particularly the case on the farm. The proper course for all such is to depend on shrubs and perennials for the desired color effects, and to discard, among other things, the regulation flower-garden, walks that have to be hoed and edges that must be trimmed; carpetbeds that have to be planted, nursed, weeded and clipped. Annuals and bedding plants also need a great deal of care; look well but a short time and when frozen or gone to seed are merely an eyesore, an ugly spot on your lawn when not covered with snow.

In ye olden time of Iowa's colonial period, the good pioneer mother did not have much in the way of flowers to satisfy her taste for the beautiful. A few annuals, reminders of her childhood home in the distant East; perhaps, a pæony; some shrubs such as lilac, snowball and southernwood. A later period brought dwarf almond and flowering currant, mock-orange and bridal wreath spires. At present, there is a surplus of ornamentals; to plant all that would grow here would require an

arboretum. You need to reject what is least desirable, the smaller your place the more critical should be your choice. To assist in this selection is the object of this paper, dictated by the

experience of many years.on Iowa soil.

First, I would discard all things that are not entirely hardy. There are some nice shrubs that are hard to reject, such as Deutzia gracilis, double and red Althea, Caryopteris, and the dark red tree peony; if you want these you had better give the necessary protection. Then, I would do without everything that suckers. Here is the list: Aralia spinosa, Spirea sorbifolia, Amelanchier, elderberry, rose-locust, flowering currant, snow-berry, matrimony-vine, and the sumachs, except the Smoke-tree. This, while rather large, is yet a very distinct shrub and makes an effective background for dark red roses.

The following are of doubtful value, or indifferent hardiness: Flowering almonds and Prunus triloba, whose blossom buds are as tender as those of the peach tree. Weigelias and some spireas freeze back in the tips and look ragged in summer unless the dead wood is trimmed out. Forsythia gives poor satisfaction, the snow-ball is liable to be ruined by aphis, the Japan variety does not seem to be a success. Petteria, Euonimus and Calycanthus are rather inconspicuous, Japan quince has an aggravating habit of hiding its beautiful orange red flowers among leaves and branches, Deutzia crenata is not hardy, and the purple plum seems unthrifty.

Now, for those that seem to stand the test. There are many kinds of mock-oranges, with not much difference between them: would plant a fragrant one. An endless variety of lilacs are offered. To my notion, the old purple kind is as good as any. White fringe, Exochorda, Bush honeysuckle, Xanthoceras and Golden spirea are recommended. Near the latter, plant purple barberry by way of contrast; this shrub makes a fine background for pink and blush roses. The foliage of Spirea thunbergi and Berberis thunbergi takes on a lovely autumn color, so does that of the Red Branched Dogwood, which is also a very conspicuous object in winter when seen against the snow or dark evergreens. Spirea van houttii, Anthony Waterer and Clethra alnifolia are elegant shrubs and should be on every lawn no matter how small. Also the Hardy Hydrangea, which, however, should be planted in a depression holding several pails of water; in case of a dry season it needs to be watered copiously. Tamarix amurensis should not be omitted; a distinct and graceful shrub; protect from rabbits in winter.

There are some roses that might be classed as shrubs; there are the sweet-briar, the Yellow Persian, the Japan rugosa, the

Cinnamon rose, perhaps, Madam Plantier, and some of the mosses.

As to the herbaceous perennials, it would exceed a reasonable time limit to even repeat the list. For single specimen on the lawn, nothing surpasses the peony, Rudebeckia, Bleeding-heart, Hemerocallis flava and the old Tiger lily are able to hold their own. If you have a shady place there is an opportunity to plant Columbines, Funkia, Evening Primrose, Anchusa capensis, Sweet-violets and Commetina. Desmodium, flowering late in September, deserves a place. Yucca filamentosa is not hardy in test winters, but it ought to be planted anyway and given some protection. A bed of perennial gaillardias looks well in the neighborhood of the blue spruce. A group of tall larkspurs furnish a color scheme of blue, and for a patch of brilliant red, give me a bed of oriental poppies. They have a habit of dying down in the summer, but reappear in the fall, and when they bloom in the latter part of May, are the showiest thing on the place. The most valuable of perennials is the hardy phlox, ranging in color from white to dark red, blooming abundantly from July to October; their failing is that they cannot resist a drouth, but they repay for giving water.

Whatever is planted in the grass, whether shrub or herbaceous perennial, should have a good sized hole dug for it the fall previous, which should be filled with rich scrapings from the cowyard. When things are planted the next spring it is well to have them stand in a depression so that they can be watered to advantage in a dry season. When the plants are well established, in a year or so, the basin may be filled up with rich compost, excepting hydrangea and hardy phlox; have these in a basin three

or four inches deep.

There are many choice native plants which might properly find a place in this connection; their consideration is reserved for a future occasion.

LEAVES.

A. T. IRWIN.

In presenting our subject, it may be well to briefly consider, first of all, the function of the leaf, its work and relationship to the other organs of the plant. Some one has defined the leaf as the lungs of the plant. It would be equally as true to define it as the stomach of the plant, since digestion as well as respiration are functions of the leaf. Through the agency of the green coloring matter in the leaf in the presence of sunlight, the crude sap of the plant is digested and assimilated. Generally speaking, the plant is entirely dependent upon the leaf to carry on this neces-

sary chemical work. It is a highly sensitive organ. A close student of plant growth can readily detect any physiological disorder of the plant system by the appearance of the leaves. A wet, soggy soil is indicated by the bilious appearance of the foliage. From a lack of moisture the tips of the leaf become brown and dead. In many plants the leaves are sensitive to light, cold, etc. From the importance of its work then the necessity of such a system of culture as will supply and maintain a healthy foliage is self-evident, and the subject is one which should interest every fruit grower.

The influence of plant food in the soil bears a direct relation to leaf growth. An excess of nitrogen gives a heavy foliage and wood growth, often at the expense of fruit. In fact, the best fruit land is not the richest one by any means. Compare our rich, black prairie soil of Iowa with the thin, poor clay soil of Missouri, for example. Trees of the latter have decidedly less leafage and a larger proportion of fruit buds, I am inclined to believe. Mr. Bomberger makes the same observation concerning the leaf growth in the bluff lands of southern Iowa as compared with other sections of the state.

On the under side of most leaves we find innumerable small mouths or stomata; in the apple 160,000 to an apple leaf. These are connected with the work of respiration, and also give off great quantities of moisture. When the air becomes very hot and dry the atmosphere robs the leaf of its moisture through these stomata faster than it can be pumped from the roots, and wilting results. Under the intense heat of the past summer I observed that many rapid growing plants with a large leaf surface, such as pumpkin, cauliflower, etc., became limp and prostrate on this account.

Upon the college grounds we have plants representing a diversity of climates. It was interesting to note the influence of the drouth upon the foliage of these plants. In some the transpiration was so rapid that the cells collapsed and the plant perished. Others seemed to flourish like a green bay tree in spite of the drouth. In many instances the climate to which they were native seemed to have a direct bearing. The wild olive and many plants from the arid regions of the west even seemed at their best under these conditions. In this connection it is interesting to notice a class of plants. known as succulents, such as cacti, and which are especially adapted to such conditions. In these the leaf is thick and fleshy, enabling the plant to store up a sufficient water supply to tide over a dry spell of months. On the under side of these leaves are few stomata, hence little is lost by evaporation.

The variation in thickness of the leaf is quite noticeable within some groups of plants. A variety of strawberry origi-

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nated near my home in central Missouri known as Captain Jack. It possessed a fruit of high quality and for a time had bright prospects. But its weak foliage readily succumbed to the rust, hence it was soon discarded. Other varieties, such as the Bederwood and Kansas, seem especially strong in their resistent power to disease. A number of complaints have been received at our office the past season that on account of its lack of foliage the berries on the Clyde were cooked on one side, and fared badly. Under the winter mulch some varieties seem to smother easily while others have a leathery foliage that will stand a good deal. Often these are points which have a direct financial bearing on the year's crop. I have spoken of thick leathery leaf; often, however, there seems to be an inherent vigor of sufficient force to resist unfavorable conditions which is not outwardly expressed by either texture or thickness of the leaf. Though, in a general way, a coarse leathery leaf is characteristic of those groups of plants which are natives of severe climates. It would be a great convenience if we could accept the leaf texture as a guide to hardiness. I am inclined to believe, however, that the characters which I have indicated as being indicative of hardiness are characteristic only of certain broad groups of plants and the variation within these groups is so infinite that we cannot accept it as a guide to hardiness. A thick foliage is in general a characteristic of our best northwestern varieties. On the other hand, the fact that a variety has a thick leaf does not by any means insure that it is hardy.

An important relation to the question of hardiness is the process of foliage ripening in the fall. We commonly speak of the leaves as being killed by frost; as a matter of fact, however, the hardening up of the wood cells, the withdrawal of the starch from the leaf to the twig and the dropping of the foliage is an essential part in the life history of many plants. This round of life is fully as essential to the plants of the sunny south as to those in the frigid north. In the greenhouse we have many plants that flourish best when dried off and given a rest period for a portion of a year. Many classes of plants have a relatively definite period of growth. The tenderness of many of our southern plants when tried in the north seems probably due to the fact that our growing season is too short, and hence they do not harden up their cells and get ready for winter in time. The difference in hardiness between the Chickasaw and Americana groups of plums is well defined. This fall, upon our grounds, the Americana plums dropped their foliage and passed into the dormant stage from three weeks to one month in advance of the Chickasaw. In fact, the latter group really failed to ripen up their foliage properly, and the leaves were simply killed by the

intense cold while yet in an active growing condition. On the experimental grounds are many varieties of apples, which have been partially top-worked with some other sort. Often in such instances the scion of the topworked variety will continue in growth for two or three weeks after the rest of the trees have quit work and gone to rest. In a group of larches in our campus is a Siberian form; this dropped its leaves the present season fully five weeks in advance of the native species.

In this connection it may be interesting to note that a rapid growing winter cover crop seems to have a perceptible and beneficial effect in using up the surplus moisture, near the surface in a wet season, and hence causing the wood to ripen earlier. On the other hand, there is a possibility of an extreme in having the wood ripen too early. In such a case, if we later have a warm spell with rains, we are likely to have second growth, and disastrous results follow. No set rules can be given as to when to cease cultivation. One must be governed by the existing conditions and the lessons of past experience.

It is evident that a plant can do its best work as a crop producer only when it possesses a good, healthy foliage. In orchards infested with the apple scab it is equally as important to spray to preserve a healthy foliage as for the protection of the fruit from this disease. In the state of Illinois in the season of 1898 the loss through premature dropping of fruit in certain orchards was excessive. Upon investigation by the Illinois Experiment Station it was proven that this trouble was caused by an attack of the apple scab on the leaves and young stems, thus cutting off the food supply. Also trees that were badly infested lost their foliage in an abnormal manner, while in those cases where the trees were properly protected by spraying the leaf was permitted to complete its work and the cells ripened for winter in a normal manner.

In closing, I desire to emphasize the important work which the leaf has to perform in furnishing us good fruit and hence the necessity of such a system of cultivation and spraying as will best protect the foliage. We should be close students of the leaf growth and take advantage of any favorable variations.

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1908

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IOWA HORTICULTURE

VOL. 1

SEPTEMBER, 1908

NO. 9

FLOWERS.

MRS. C. F. HARKNESS, HUMBOLDT.

As this is a flowery subject, perhaps you will expect it to be handled in a flowery manner. But I must ask your kind indulgence, and hope you will pardon my matter of fact and prac-

tical way of treating the subject.

The floral families are very numerous, and each family and all its individual members have their own individual habits and dispositions, and it requires as close study to understand and cultivate them successfully, as it does our own human families. They are organized, living, loving beings, and as such require food, air, sunlight and rest. Like animals, plants absorb and digest nutriment, and use the digested material, increasing their own form or bulk, and for propagating their own species.

Plants naturally feed upon inorganic materials, such as mineral salts from the earth, and gaseous carbon from the air. This air is absorbed through the pores of the leaves, hence the necessity of plants being kept free from dust, in order for them to thrive luxuriously. Professor Gray says there are 120,000 pores to the square inch of the leaf of the common lilac. Carbon dioxide is deleterious to human and animal life when taken into the lungs; hence you can readily see that plants are living filters which purify the atmosphere by freezing it from the carbon dioxide, which otherwise would soon render the air unbreathable by men and animals. Little or no clearing of the air occurs at night, and but little during cloudy days. This fact brings up the question as to the healthfulness of plants in living and sleeping rooms. The botanists have divided the vegetable kingdom into two series. The Phænogams, or flowering plants; the Cryptogams, or flowerless plants. This second class includes the ferns, palms, mushrooms, lichens, seaweeds and microscopic fungi generally.

Ferns and palms, on account of their graceful foliage, have always been been of special interest to lovers of plants. The fern family reaches from pole to pole; they are more abundant and larger in the tropics, and there are known about 3,000 species of ferns. In the temperate zone they are low growing; in the tropics there are found tree ferns, some forty to fifty feet high.

In the carboniferous age, when coal deposits were formed, gigantic tree ferns were common in the regions where we now find coal beds.

Mushrooms belong to the parasitic fungi which are always injurious to humanity. It is estimated that the annual damage to useful plants and crops of the United States by parasitic fungi amounts to over \$200,000,000. Potato rot, mildew, grape blight, wheat rust, etc., are all caused by parasitic fungi.

The saprophytic fungi that feeds on dead organic matter, reduce it to its inorganic elements. Without their work, the earth would soon become so encumbered by the remains of animals and vegetables that there would scarcely be room for the living. Those which attack organic matter meant for food are injurious, such as molds, fungi or bacteria, which are so small that they are invisible. Yet so wonderful is their power to increase, that next to the light of the sun, the principal motive power for good and evil in the world, they rank second.

It is to these micro-organisms that we owe the raising of our bread, the ripening of our cheese and butter, souring of milk and fermentation of all alcoholic liquids, and probably the digesting of food in our stomachs. On the other hand, it is to certain genera of bacteria that we owe our most malignant diseases, such as smallpox, consumption, la grippe, diphtheria and many other diseases of man and beast. Hence, bacteria are useful servants, but dangerous masters. How to control their activity, in order to increase their beneficial powers and repress their power for evil, is one of the greatest problems of modern science.

It is the popular impression that plants exist only on the land; yet the sea, too, has its flora even more gorgeous, and scarcely less varied in species, than the land. Time will not permit any description of their wondrous beauty, or to classify the flora of the land. A brief mention of some must suffice. The study of any local flora requires classification.

The whole number of distinct species of plants in the world is estimated to be about 180,000. In our country about 12,000. The distribution of species varies with altitude, latitude, humidity, and the nature of the soil. Of the 200 natural orders of phænogams only about a dozen are of much commercial value. The grass family, which includes all the cereals (except buckwheat, which belongs to the smartweed family), furnishes the greater part of bread, sugar, starch, beer and whisky, etc., consumed by the human race. Many grasses furnish medicine; only one is known to be poisonous, the poison darnel.

The rose family includes all the best fruits of the temperate zone, and among the ornamental plants are the rose, spiræa and hawthorn. This order, so useful in cool climates, in the tropics FLOWERS 259

are only trashy shrubs and herbs. Our fruit family is second to the grass family. The pea family takes third place, and includes the pea, bean, lentil, clover, lupine and other forage and food plants. Among trees the coffee tree, honey locust, acacia and silk tree; of useful plants, the indigo, peanut, senna, dyewood and the classical broom of Scotland and some poisonous plants are found in this family; the most notorious is the loco weed.

Next to the pea family we must rank the potato family, which includes the potato, tomato, pepper, egg-plant, tobacco, as well as henbane, belladonna, thorn, and other narcotic poisons. Its most ornamental member is the petunia. All these are tender in cold climates. Next the food families comes the family which supplies us with timber, such as the pine, cypress, juniper, arbor This order seems to occupy a peculiar position in the system of classification, as a connecting link between the flowering and flowerless series. Of the less important families are the mallow family, which furnishes our cotton, okra, hollyhock, althæ, and many medicinal plants. The flax family, the nettle family, which includes the hemp, ramie, the hop, the mulberry and elm; the oak family of oaks, chestnuts, and hornbeams; the walnut family of walnuts and butternuts; the parsley family of parsnips, carrots, celery, and many medicinal plants; the cabbage family of turnip, radish, mustard and cress. Among the ornamental families the lily, heath and buttercup families take Of the weed families the daisy family ranks preeminent, including, as it does, our thistles, cockleburs, fleabanes, hawkweeds, sneezeweeds, daisies, goldenrods, and asters; it also includes the queen of autumn flowers, the chrysanthemum. Its sole contribution to our tables is the lettuce.

Some of the most beautiful creations of nature are wrought in vines; they beautify whatever they touch. What more beautiful than to see a dead monarch of the forest covered over with vines, seemingly trying to shield its old age and decay from the profane gaze of the young and giddy. The airy gracefulness of vines are a perpetual delight to the eye. The American Ivy is one of the most satisfactory climbers we have; it thrives in any soil and is very hardy; the Red Coral Honeysuckle is another beautiful and hardy climber.

The bulb families have, or should have, a prominent place in the floral world. Flower lovers lose much if they neglect the cultivation of bulbs for winter bloom. They are of easy culture, and very satisfactory for the amount of labor expended. All they ask is a good generous soil, to be put in the ground in the fall (not in the spring, no more than you would plant peas in the fall and expect good results) and nature will do the rest for you.

Among the bulb families may be found that little gem, the scilla, a beautiful blue flower, gracing our homes from Christmas until May. Freesias are another desirable winter bloomer, because of their great beauty and delightful fragrance. daffodil is another. The hyacinth needs no commendation; it needs only to be seen in order to be appreciated. They are jewels of genuine beauty. Of the tulip enough cannot be said in its favor as a gorgeous and beautiful bloomer. Any one planting a bed of tulips may confidently expect full returns in the spring. Instead of deteriorating they increase rapidly. Then comes the narcissus family. The best effect is produced by planting in clumps and not disturbing them for years. The crocus is another interesting family, charming when planted in groups; they multiply very fast and ought not to be disturbed for years. Their winter cousins, the snow drop and glory of the snow, comes peeping up from the snow, asking old winter to hasten his march to the sea, gladdening our hearts with their little harbingers of spring, and trying to tell us that winter's icy fetters are broken. Among the many varieties of plants in my windows not one seems ungrateful for my care; they are not summer friends even if they are summer bloomers; they always greet me with a glad smile even when circumstances compel me to neglect them.

NATIVE IOWA FLOWERS WORTHY OF CUL-TIVATION.

EUGENE SECOR, FOREST CITY.

The object of this paper is to call attention to a few of the things that are American, but, nevertheless, desirable. They grow not only under the stars and stripes, but in the soil of peerless Iowa. I cannot mention them all; have neither the space nor the knowledge necessary.

In early spring, soon after the snow is gone, the children, coming from neighborhoods where native woods abound, may be seen trooping to school with handfuls of Dog's Tooth violets. It grows in great confusion in moist, shady places. The variety which grows here is pinkish white, with long stems, making it suitable for bouquets. It belongs to the lily family. Its two leaves, between which the solitary flower stalk emerges, are striking because of their mottled appearance.

This flower pushes its way through the blackened leaves of autumn which strew the ground, heeding not these symbols of death and decay. It lifts its chaste and tender blossom of hope into the glorious sunlight before the trees above overshadow it by their denser foliage. Anyone who has a shady nook in the

yard can easily add this native specimen, which is an early har-

binger of the resurrected life of nature.

One of the most interesting and showy flowers of early summer is the Columbine, found in all our northern woods. In the eastern states it will make its home on rugged mountain crags, as if it loved the wild, unfrequented spots where scarcely soil enough exists to cover its roots; but it flourishes equally well in the deep rich mould of our western woods, and is easily at home in the flower garden of the rich or poor. All it asks is a sequestered spot and such conditions as may be easily furnished. Delicate and graceful is this scarlet-flowered perennial, and worthy of a place in every amateur's collection.

Snowy Orchis.—This is a wood nymph. The name hardly conveys the correct idea of the plant or flower. It is not conspicuous, but when found repays the search. The blossoms are fragrant, and though not large are pretty, and the plant de-

sirable for cultivation.

Brown-eyed Susan.—This is one of the cone flowers described by botanists. Where one comes upon a lot of these flowers they constitute one of the charming sights of the prairie. They are admired by everybody. Apart from the blossom the plant is not attractive, but is worthy of cultivation for the flower alone, especially if massed. The brown, almost black, center contrasts so beautifully with the bright yellow rays that the effect is very pleasing.

Wild Yellow Lily (Lilium Canadense.)—Who among pioneer flower lovers of the west has not admired this modest floral queen that added its grace and beauty to the prairies of Iowa before the white man turned the virgin sod? Its bell-shaped flowers, usually growing in pairs, stand above the surrounding prairie grass, but, as if not wishing to outshine its more sombre neigh-

bors, it gracefully droops its head.

If anyone can ride over the prairies in July and resist the temptation to pluck a handful of these beauties to decorate the table at home, he lacks a little of that divine appreciation of beauty in nature which is the real foundation for a love of art. I seldom see among the imported *lilium* novelties anything more desirable than this quite common species found on unbroken prairies.

Another of the lily family (Lilium philadelphicum), popularly called the Wild Orange lily, is also a native of the prairies and worthy of a place in every collection. It is not as modest as the one just referred to, and more showy, as well as more bold. Its petals are so open and wide apart at the base that the July zephyrs have full play among the stamens, and probably help to dislodge and transport the life-giving pollen to recipient neigh-

bors of the same species. The freckled appearance of the inside of the blossom shows it to be a child of the sun.

I believe another variety is found in some parts of the state, called by botanists *Lilium superbum*, having a cluster of flowers on a single stem. I am informed that it is a very handsome bloomer under cultivation.

Yellow Lady's Slipper.—If this unique specimen of the floral kingdom were an importation from some far-off country, we would prize it beyond measure. For delicacy, beauty and oddity it almost stands alone among our native flowers.

It is in strong contrast to the last one described. While the beauty of the orange lily is conspicuous and self-asserting, the lady's slipper seems formed for the companionship of the solitary honey bee which, in her friendly visits in search of nectar, is decoved into the chamber of royal living.

An imaginative mind might liken the blossom to a life boat in which the fairies sail through space, the twisted petals being the sails, and the almost closed portion their habitation. It is a perennial and grows in our woods.

Cranberry Tree.—This is a cousin of our common and popular snowball. The bush resembles the latter and is quite as ornamental, taking the whole season through. While the flower is not so showy and perfect as the snowball, the clusters of red berries which hang on till the leaves are fallen, are not only pretty, but useful in a culinary way. It may be propagated in the same manner as the snowball.

The snowberry is a near relative of the tree honey-suckle, and there are several wild species growing in Iowa.

Spireas are common in this state, and while not so brilliant in color as some of the newer sorts, are worthy of notice in making a collection of Iowa native flowers.

The sweet williams or phloxes that used to make the prairies gorgeous in June and July are fast disappearing under the hoofs of cattle and the white man's plowshare.

But lack of space forbids my commenting at length on even a small fraction of the number of flowers and ornamental shrubs once common in this state. If time permitted I might add to the above list such herbaceous plants as trillium, cranesbill, Indian turnip, wood daffodil, a number of ferns, white pond lily with yellow center, blue flag, blue and yellow violets, blood root, prairie clover, vetch, and that queen of autumn flowers, goldenrod, were it not so common as to make us overlook its beauty. Among native shrubs the scarlet fruited hawthorn, bitter sweet and scarlet honey-suckle are fine enough for any grounds anywhere

The wild rose, too, may be found in all shades of color, from

pure white to deep red, and some of them as handsome as the rugosas of European importation.

Sweet remembrance of pioneer days, shall the vandal tread of civilization, in its onward conquering march, consign you to

the realms of the forgotten past?

Instead of the once gorgeous prairies and the perfumed breeze from nature's flower garden, shall we henceforth be compelled to view the utilitarian cornfield and forever be satisfied with the fragrance of the farmer's hog lot?

Such are the compensations of modern life and American progress, unless we cultivate a spirit of veneration for the old

favorites—the floral treasures of Iowa's maidenhood.

THE DAHLIA.

G. D. BLACK, INDEPENDENCE.

In tracing the history of the dahlia we find that it is a native of the high table-lands of Mexico, where the soil and climate are but little different from our northern Iowa summers.

Our rigorous winters prevent us from growing many of the shrubs and roses and I know of nothing better to supply this deficiency than the dahlia, as it blooms from June to October.

It surpasses all other flowers in its brilliant colors. In it we have all the colors and tints of the rainbow, except pure blue, and we expect to see this in the near future. It gives us black and even green blossoms, which are rare colors in the realm of flowers. We have varieties which grow scarcely one foot high and others which with favorable conditions will occupy more than one hundred cubic feet of space.

The blossoms of the different varieties range in size from one inch up to nearly a foot in diameter. Some of the show and pompon varieties are so regular and uniform that it gives one the impression that the flowers have all been cast in the same mold, while in the decorative and cactus types they are sometimes twisted and curled in all manner of shapes.

We know of no other flower or plant that has so many colors, forms and habits of growth. In fact, you may grow a thousand seedlings and not be able to find two resembling each other in all respects. This great diversity is caused by the many crossings and hybridizing through which it has passed during the last century.

Our exhibit at our county fair of nearly one hundred varieties was a revelation to many and we believe this is one of the best ways of creating an interest in flowers and fruits. An exhibit of this kind requires quite an outlay of time and care, but the many exclamations of delight from lovers of flowers is

ample reward for the labor bestowed in putting up the display, even if you do not take into account the crowded condition of your order book.

Many inferior varieties have been introduced to the public and this has a tendency to discourage their culture. Some that do well and make a fine display in Europe and some parts of the United States are a failure here. We are growing and testing many seedlings and expect to get varieties that are adapted to our locality. Our most promising one was grown from seed of Blue Jewell that had been fertilized by pollen from A. D. Lavoni. It has the long wiry stems and great profusion of bloom like Lavoni and contains more blue color than F. L. Bassett, which is said to be the nearest approach to pure blue but has short stems.

We have frequently been disappointed in ordering new varieties from the introducers by their substitution of something that we already had. We have ordered Mrs. Roosevelt the two past seasons, but when the blooms opened we discovered in the first instance that we had Catharine Duer and this last season we got a small red sort of no value. Next spring we will try, try again. We have received plants which grew and bloomed out well, but when we dug them in the fall expecting to have a nice stock for the next season we found a bunch of worthless roots because the propagator through ignorance or worse than ignorance had not made the cuttings properly by cutting them just below a joint. For this reason we always order the dry roots, if possible to get them.

A large proportion of our population do not own their own homes and will not buy ornamentals and shrubs with which to beautify their surroundings, but they will frequently buy dahlias because they say they can take the roots with them if they should move. Many niches and corners that produce only weeds could be made beauty spots by a few dahlia roots and a little effort. A judicious selection should be made and the tall rank-growing kinds planted in the background and the dwarf varieties in front of them.

There are several modes of culture in dahlia growing, but much depends on the soil, variety and situation. The soil should be only moderately rich if you wish an abundance of bloom. The large rampant-growing varieties with their mammoth blooms look best when viewed from a distance and should be securely tied to firm stakes. Those which naturally grow only four or five feet high do not require staking if the center bud is pinched out when the plant is four or five inches high. It will then branch out near the ground and form a low, bushy plant which will produce many more flowers just as large as usual and will

be seldom injured by the wind. In an acre of dahlias growing in the field this last season not more than a half dozen were blown over by the wind.

About the first of May we take the dry roots from the cellar and divide them with a sharp knife so as to have only one eye or sprout to each piece of root. They form better plants and flowers if only one stalk is allowed to grow. We plant them so that the point from which the sprout starts is from four to six inches below the surface after the earth has been leveled. We cover it only about one-half inch deep at the time of planting and fill in two or three weeks later after the plant has formed a strong, hard, woody base. This deep planting has several advantages. It gives the plant a firm anchorage against the winds. It is not so easily affected by the drouth and the new roots are not injured by early freezes in the fall.

The dahlia can not do its best unless it has plenty of room and good cultivation until the middle of summer. In field culture we make the rows about eight feet apart and cultivate often enough to keep the surface covered with a dust mulch. Dealers in their catalogue descriptions usually extol the beauty of the flower but fail to mention the height and habit of growth of the plant and we have frequently been annoyed because those of a dwarf growth in our test bed were completely overshadowed and hidden by others.

This paper would be incomplete without a short description of a few of the varieties that have been more or less satisfactory with us. For convenience we will divide them into a few general classes: Show Dahlias have round, regular double flowers with the petals curving toward the center.

Penelope grows three feet high. We place this at the head of the list as it is probably the most beautiful dahlia grown. In taking eighty-two orders at the county fair, forty-four customers selected this as their first choice. It is a pure white tinged lavender.

Gem-Two feet; large, red.

A. D. Lavoni—Three feet; pink; an early and profuse bloomer.

Snow—Three feet; pure white.

Uden—Four feet; purple.

Sunrise—Five feet; yellow, tinged red.

Cuban Giant—Six feet, very large; dark purple maroon, long stems.

Magnificent—The plant grows about the shape and size of an inverted bushel basket and makes a magnificent bedder. Large, yellow, sometimes tinged scarlet.

Verdiflora—Two feet; has perfectly double green flowers formed by a multiplicity of bracts instead of petals.

Decorative Dahlias are those which usually have long, loose,

flat petals.

Wm. Agnew—Three feet; large; bright scarlet. This is conceded to be the best of its color and class.

Mrs. Winters—Three feet; large; pure white; beautiful form with rather short stems.

Nymphea-Four feet; pink with white center.

Apple Blossom—Two feet; has the color and various shades of apple blossoms. Is very pretty but has short stems.

Silvia—Three feet; large; pink, long stems.

Zulu—Two feet. This is called the black dahlia but fades to a dark maroon. Has short stems.

Salmon Queen-Four feet; large; salmon color.

Yellow Queen—Four feet; always loaded with fine yellow flowers.

Client—Five feet; has fern-like foliage and bright red flowers.

Blue Oban—Four feet; large lavender-colored flowers.

Eureka—Three feet; pure rose color; fine.

Pompom Dahlias have small flowers from one to two inches in diameter and are usually very full of blossoms.

Snowclad-Two feet; pure white.

Catherine-Four feet; yellow.

Sunshine—Four feet; dark red.

Kleim Domatia—Two feet; orange.

Elegante—Two feet; bright pink.

Cactus Dahlias have their petals curved back and sometimes twisted to a point.

Gailard—Two feet; bright red.

The Queen—Three feet; pure white.

Countess of Lansdale—Three feet; salmon buff; has long stems and is probably the most profuse bloomer among the cactus varieties.

Kreimhilde—Four feet. The outer pink petals are curled and twisted while the center of the flower is composed of broad white petals. We should consider this the best dahlia in the list, especially for a cut flower, if it was only more productive of blossoms with longer stems.

In single dahlias we have found nothing better than Twentieth Century and its seedlings.

Pres. Viger is called the colorette dahlia because it is composed of eight broad, flat dark red petals with a row of short white petals just inside them and surrounding the large yellow center of stamens and pistils.

I first took up the study of the dahlia as a recreation from

my other work. My friends say it is becoming a hobby with me as the strawberry was a few years ago, but nevertheless I find that the riding of these frisky colts is very healthful and restful exercise for both mind and body.

THE WINDOW GARDEN.

It is gratifying to note the large number of dwellings in which plants are cultivated. This is evidently an advance in the right direction, for whoever has the moral elevation of the race at heart cannot other than regard the influence of floriculture as tending in that direction. How cozy our apartments appear when well supplied with blooming plants during the winter months. Their green foliage and bright flowers form a pleasing contrast with the landscape covered with snow. They are not only a source of pleasure to those who possesses them, but also to those less fortunate who may be fascinated with them as they pass by the window. Thus window gardening often stimulates others to greater exertion to make their homes more attractive. Few, indeed, are so poor that they can not afford the small amount of money and labor required to secure that which will give them so much pleasure. It is to foster this love for flowers that we write to encourage those who have been deterred from cultivating them by fear of failure, or lack of funds.

To amateurs in floriculture, we may be able to make a few suggestions that may be helpful to them. While your operations in the small space the window affords will not be as extended as in the flower garden, nor as expensive as in the conservatory, yet your efforts, if properly directed, will bring results that will give as much pleasure as either of them. After a little experience you will be surprised what a large number of plants can be grown successfully in the house during a year. The first requisite for growing plants in the window is a love for them; without this success will be almost impossible; with it failure equally Plants require but little care to keep them in a healthy Their wants, though few, must be attended topromptly, or they will soon become unhealthy, lose their beauty. and thus become objects of sympathy rather than of admiration. There are no fixed rules for the cultivation of plants that we can follow with the same hope of success as in a mathematical Yet there are a few principles that govern demonstration. plant growth from which we must not depart, if we would have beautiful flowers and healthy foliage to delight the eye and! cheer the heart when all without is held in winter's icv embrace.

One of the first things we must do is to supply an even temperature, congenial to the class of plants we would cultivate.

Failure often results from attempting to grow too many different varieties in the same degree of heat. You cannot successfully grow bouvardia and cineraria in the same temperature, the former requiring ten or more degrees of heat with bright sunlight, while the latter luxuriates in a cool, partly shaded place. If you are confined to the limits of one window then give attention only to such varieties as require as near as possible the same treatment. A few plants well grown will give more pleasure than a great number in a poor condition. most of our rooms, however, there will be a difference of five to ten degrees between the air near the floor and that near the ceil-So by placing the plants which require a low temperature in the lower part of the window, and those requiring more heat near the top, we can add greatly to the comfort of the different varieties, and should you be fortunate enough to possess windows further removed from the heater, you can increase the number of varieties. Most of the plants desirable for window culture do well in a night temperature of forty-five to sixty degrees, with a rise of ten to twenty degrees during the day time. Whatever degree of heat you can maintain at night will, usually, determine the class of plants you should grow. Whatever degree of heat it may be, try to keep as near to it as you can; do not run from one extreme to the other. Avoid sudden changes. as plants are as sensitive to a cold draft of air as members of the human family. Ventilate freely, but not directly on the plants in very cold weather, or they may be chilled, but give plenty of fresh air, which they will enjoy as well as other inmates of the house.

Our rooms are usually kept too dry and hot, not only for the plants but for our comfort as well. This may in part be obviated by evaporating water on the stove, placing a saturated sponge in the draft of the hot air register, or by letting steam escape from the radiator, whichever method of heating you may If the air of the room is dry and hot, the red spider will soon take possession of your plants and spoil the foliage. little mite is one of the most insidious foes of the window garden. Syringing the foliage, as usually practiced in the greenhouse, to keep it in subjection, is impracticable in the window. Dipping the plants in water is the best method of ridding smooth-leaved plants of dust and insects. If to the water a little tobacco is added, it will destroy the green fly, which sometimes infests the plants. Syringing, however, should not be entirely omitted, but cannot be done as freely as in the greenhouse. A great deal of care should be taken in watering the plants. More plants die, or linger in a miserable condition, from too much water than from any other cause. Do not allow the soil to become sour, which is apt to occur if constantly saturated with water. How

often we should water can only be determined by the vigor of the plant, and the condition of the atmosphere. In cloudy, damp weather, a thrifty plant may not need water for nearly a week, while on a hot, sunny day it may require water twice a day. However, when you do water, do it thoroughly, wetting all the soil in the pot, then do not give any more until the soil is dry, will crumble between the fingers without sticking together, but do not allow the plant to wilt, as that would check its growth, and with some woody plants would prove fatal. The soil may appear moist on the top, while the roots are dry and suffering for water. This may be the result of two causes, either from over-watering, so that the soil runs together like mortar, then when it dries out it bakes so hard that the water when applied runs between the ball of earth and the pot and escapes from the hole, wetting only a small portion of the soil on top and around the sides of the pot. This sometimes happens in repotting plants when the ball of earth is dry and the soil filled in around it has not been pressed firmly against the roots. Or the plant may suffer for water when it is applied frequently, but in such small quantities that it never penetrates to the bottom

For soil, I use a mixture of well decomposed manure, sod and decaying leaves. These are placed in a compact heap and forked over several times during summer. When wanted for use, a little sand is mixed with it, and sometimes charcoal is added if

to be used for plants requiring a great deal of water.

If you can have a choice in the location of the window, select one facing east for spring and fall, but during winter, a south window is the best for blooming plants, but if you cannot have either, do not be discouraged, for even a north window can be made attractive with foliage and with a few flowers during

spring and summer.

Now, what plants shall we select as the best adapted for window gardening? This, perhaps, must be left for the grower to determine. The variety of plants is so large and their characteristics so varied, that all tastes may be gratified. A window plant should be beautiful and remain so for a long time. In the small space the window affords we cannot have a nursery to coddle young plants till they arrive at blooming size; nor a hospital to care for the aged after they have exhausted themselves in the good cause. I believe many will concede that the geranium is very near an ideal window plant. It has bright, pleasing foliage; is a vigorous grower and free bloomer; very patient under ill treatment, and usually free from attack of insects. Except for the beauty of the petals of some of the single sorts, the double varieties are to be preferred, on account of their blooms lasting longer. The cultivation of the geranium

is so simple that almost any one can succeed with it. Plants that have been blooming in the open border all summer will not give many flowers if lifted late in September until after January. It requires, even for this vigorous plant, some time to recover from the mutilation its roots must undergo to get them in a small pot, that it is hardly advisable to do so. The better method is to prepare the plants during summer. In April or May start cuttings. When these are well established, shift to larger pots; these may be "plunged" in the garden in June. Keep the plants pinched back to make them stocky and sym-This operation may require a little courage, for it is rather trying to nip off a promising flower bud; but if you don't do it, you will regret it when the plants are brought to the win-They will be tall, ungainly giants, which to behead now, means neither beauty of foliage or flowers. In dry weather it is well to mulch, for plants in pots suffer more during a draught than when growing in the ground; besides it saves a great deal of watering. By fall, if they have been carefully tended, they will be large, fine plants, well established in six inch pots. Larger than this is hardly desirable for the window. On the approach of cold weather, bring the plants to the veranda, where they may remain until placed in the window, where they will bloom all winter.

Another class of plants I would commend to your careful consideration is the Flowering Begonia. Few plants give a brighter display than some members of this class. Many people prefer them to geraniums. They require a little more heat, but are easily grown, and free from insects. Better not try the Rex type until you have had experience with the other sorts, as they require more care, dislike to be moved, and are impatient with dust.

Abutilons do well in the window; they are vigorous growers and require considerable pinching back during the summer to get a compact, bushy head; for the more branches you have the more flowers you will get.

Do not forget the primrose, for they are constantly in bloom. Nearly everybody wants a calla; do not divide it; give it a rich soil and plenty of water, let the pot be as small as you can get it into and you will have plenty of bloom if the plant has had a little rest during the early part of the summer. The spotted calla will also do well in the window, if you start it during February; it is a summer plant and wants to rest in early winter. It will bloom by Easter. When the weather gets warm plant it in the garden and let it grow all summer.

Fuchsias are excellent plants for the window in the early spring months; but give very few flowers during the darker days of winter. Hyacinths that have been potted in the fall and

kept in the cellar or other cool place until the pots are well filled with roots, will grow fast when brought to the window, and give us large, fragrant spikes of bloom, that will more than pay for the effort in taking care of them. Narcissus will add to the collection an abundance of white or yellow flowers. Unless your room is warm at night, better not try to keep coleus through the winter. Achyranthes are hardier and will give you a bit of bright colored foliage. Some of the hardier palms do well. Ferns do well where there is little direct sunlight. There is an abundance of material, so that no windows need be without a plant so long as the frost is kept out of the room.

ABUTILONS.

These shrubs belong to the Mallow family, and are very free flowering plants. They are easily grown, but will need attention if fine plants are wanted. They delight in rich soil and plenty of water when growing rapidly, but the drainage must be looked after or the soil will soon sour, then the leaves will turn yellow and drop off.

Abutilons are easily propagated from cuttings made from new wood either in spring or fall. To get good plants for the window it is best to grow them in pots during summer, for when planted out they do not lift easily. They are gross feeders when set in the garden and soon make large plants. There are many varieties in cultivation as well as garden hybrids, so we can

only name a few of the leading sorts.

Snow Storm is the best dwarf white. Boule de Neige is more largely grown, but does not make as neat a plant for the window. Yellow Prince, Golden Fleece, Golden Bells and Ed. Layeillan have bright golden yellow flowers. A. Belsham, Royal Scarlet and Blood Red are good red sorts. Heilbron has orange colored flowers and the foliage marked with yellow. Thompson plena has double flowers and mottled foliage. Souvenir de Bonn has dark green leaves with a white margin. Savitzi is used in bedding for its white foliage.

Mesopotamicum pictum is a nice plant for basket or vase, the foliage is small and richly variegated with yellow and green.

Eclipse is more robust in growth.

Abutilons are not troubled much by insects. Scale will sometimes attack them, but they are easily removed.

The Editor's Page.

All hardy herbaceous plants, or shrubs, the top of which can be cut away so that what remains can be covered, or will not be exposed to the sun or atmosphere, may be safely planted in the fall; but trees or large shrubs, where the tops will be exposed, I would not plant until spring.

The dry air of winter in this climate absorbs more moisture from the tops of newly set trees than their mutilated roots can supply, it lowers their vitality if it does not kill the trees.

When frost has killed tender bedding plants remove them at once and dig over the ground with a fork to prepare it for setting spring blooming plants. Dutch bulbs grow best in rich, sandy, well drained soil. Moisture is necessary, but an excess of it will cause the bulbs to rot. When the soil is a stiff clay we have found by experience that it will greatly improve it for bulbs by digging in plenty of well decomposed manure. Sand mixed with clay soils or placed about the bulbs will give drainage sufficient to protect them from decay. The beds should be high enough so that water will not stand on the surface of the soil for any length of time.

Tulips in separate colors for bedding, or massing for color effect, make a gorgeous display when in full bloom. By making a selection of early, intermediate and late varieties the display can be kept up until June. It is a mistake to plant early and late sorts in the same bed. To have the plants bloom at the same time the bulbs should be of the same relative size and planted to the same depth.

Hyacinths are not as satisfactory for bedding in this climate as tulips, but are superior to them for growing in the window garden.

October is the best time to plant Bleeding-Heart, Day-lilies, pæonies, iris and hardy roots that start to grow early in the spring. These plants begin root growth in the fall.

We hear a great deal about sap in trees being "up" or "down" at the approach of cold weather. Some people seem to

believe that the sap descends to the roots of the tree in the fall and remains there in a dormant condition, hibernating as it were like an animal, and does not ascend again until warm weather arrives and growth begins in the spring.

Perhaps there is no statement more misleading than that of the upward and downward flow of sap in plants, or that there is a circulation in any way similar to that of the blood in the higher animals. The sap performs the same function for the plant that blood does for the animal, but the manner of doing it differs as widely as does the life history of the animal from

that of the plant.

The movement of sap in plants, as we understand it, is something like this: The roots absorb water containing soluble salts, which contain a part of the plant's food; the roots imbibe this water in such quantities as will keep the cell-walls filled to a certain tension. The amount of water absorbed depends upon the quantity evaporated and used as food. In the dry air of summer the water is sometimes given off faster than the roots can supply it, then we notice a wilting of the foliage, a closing of the doors, as it were, against evaporation. When evaporation ceases the upward flow of water stops, but as soon as the air becomes drier than the surface of the plant evaporation occurs and more water is taken up by the roots.

The flow of water then is upward to supply the loss caused by evaporation, but it also serves another function, that of conveying the crude material contained in it to the leaves, where it undergoes changes necessary to prepare it for further use of the plant in building up its structure. This aerated food material must be distributed from the leaves; the process is one of diffusion rather than of circulation. The nutriment moves toward the point of growth. When rapid growth is being made in the root, as with the turnip or beet, it is downward where the organized matter is stored for future use of the plant; then when the seed stem is developing this stored material is carried upward to complete its growth. The direction in which the nutriment moves is governed by the life energy of the plant, which is probably exercised through the membranes that form the cell walls in different portions of its structure. Diffusion by membranes is a very important element in determining the movement of molecules of a liquid, or of substances in solution.

When the leaves fall the plant factory, so to speak, suspends business. The sap does not descend to the roots of the tree, but is stored in the body and branches in a more solid form to beredissolved the next season for future growth.

When we plant hyacinths there is an active root growth in the soil, but nothing green appears above the surface of the ground. These roots absorb very little water from the soil, just enough to supply a medium to convey the organized material that was stored in the bulb during its period of growth. The factory is closed, no plant food has been made since the leaves died, but the roots have grown, not from what they obtained from the soil but from the stored material in the bulb. The roots of a plant live as fungi, obtaining their food from the plant of which they are a part or from organized matter in the soil. So the mystery of plant life is still unsolved, but exceedingly interesting to those who give it any attention.

CARNATIONS.

J. S. POLLARD, ELDORA.

Gentlemen, it affords me much pleasure to prepare a short

paper on my methods of growing carnations.

PREPARATION OF CUTTINGS: I find early spring cuttings are best, as they seem to grow more rapidly as the days grow longer. Choose strong, healthy cuttings of medium size from the most vigorous, healthiest and best blooming plants. Take a batch of these and trim them, and have a tub with strong lime water in which immerse the cuttings for a half hour or so. Then wash them with soap suds thoroughly, and after they are clean rinse with clear water. This process cleanses them of thrip egg, or any disease that might afterwards give much trouble; it insures clean plants.

The bench is washed and limed. The bottom is pretty close so the cuttings will not dry out. Only one good watering, with a light overhead spraying on bright days, is needed until cuttings are thoroughly rooted. Then pot or box them, using a good fibrous meadow soil without any mulch or sand. Do not pinch the young plants until about March 15, as plants are healthier if not pinched. Place young plants in $3\frac{1}{2}$ inch pots by April 15 if possible.

As soon as the weather is favorable plant out in the field on spring plowed ground, planting when the ground is freshly plowed, while it is fresh and moist. Plant twelve inches each way, using a wire line with marks every twelve inches. A hand plow can be used each way, just as a farmer plows his corn, only on a miniature scale.

Go through them after each rain and sometime between rains,

always pinching them back to shape the plants.

The next process is to prepare the benches. It is generally best to commence this work early in July, so that all the plants may be benched during July. Mend and lime the benches, and cover the beds with thin blue grass sod. On this fill up to level with a prepared carnation soil which is prepared as follows:

PREPARATION OF SOIL: In early spring find, if possible, rich

fibrous meadow bluegrass soil, brown in color, if possible. This idea was first procured from an old gardener whom I served under as a boy, afterwards from the Dixon Bros. of Nawtonards and Belfast, Ireland, who, by the way, have given us some of our best roses, especially the renowned Killarney. Do not pick this soil from a swampy place, as that would be sour. Neither must it be taken from a hill, but try to find a level between where the grass is green and the soil is fibrous. This, in my opinion, is one of the principal points of our success with both carnations and roses. Put this soil in a stack, grassy side downwards, with one-third part old rotten cow manure. Mix as early as possible and do not turn until ready to use, then mix as put on the bench.

The above described soil has been used for all carnations that I have as yet grown, with the exception of Hallawarden, and as this carnation, with an equal number of white, is properly arranged together, you will find one of the richest and most

beautiful boquets imaginable.

For Hallawarden I use a much firmer soil; that is, I take out all the rough sod and only use fourth rotten manure, well mixed. The proper heat for this carnation I find is from 38 to 40. Try this once and if you don't have a surprise, then I will be much mistaken. You will have blossoms as large as the largest Lawson with 36 inch stems as straight as a willow. I have as yet not been able to supply the demand for this carnation at \$1.00 per dozen all winter.

I plant eight inches apart and water to keep my plants on the damp side. In clear weather I keep a little air on nearly all the time, even if I have to turn on another line of steam. This

is essential to keep the plants in proper health.

Now just a few words concerning insects, as it is to every florist's benefit to try his utmost endeavors to keep these down. I find the thrip is a nuisance, and any one who has it need not keep it. I had it once and made short work of it. I picked all the infested blooms and threw them in the furnace, then picked all the saleable blooms and put them away. I then slacked some lime lumps, and when slacked scattered a thin, even coat over my benches, then applied the hose with a strong spray, using my fingers as a sprayer, going up the bench in such a way as to wash every plant, and as the little pests fell the lime did the rest. This I repeated two days afterwards and that was all. The lime water on the benches burnt them as they fell.

I believe the carnation has not nearly reached its full perfection and find that it is not the quantity, but the quality, that pays me best. From Thanksgiving to after Decoration Day I hold my carnations at \$1.00 per dozen, and find no trouble in disposing of them. Of course I grow roses and different other

flowers, but carnations are my specialty.

LAWN VASES, PORCH AND WINDOW BOXES.

G. A. HEYNE, DUBUQUE.

There are conditions in city gardens, or yards, that require the flower lover to devise means of protection to his flower pets. Again, there are positions that make it necessary to have his plants up off the surface of the ground so as to be able to see and enjoy them, or prevent damage to them. Also there may not be room to plant on the ground, and to have flowers it will be only in some receptacle.

The multitudes of these conditions have brought into use lawn vases, rustic boxes and stands, and the porch and window boxes. To have these at their best, the construction of the vase or box, the mixture and condition of the soil, and the plants must all be right, well chosen and planted, and then proper care should be given to them. This is the object of this paper. From an experience of twenty years we give briefly the more important points on the subject.

The boxes should be seven to nine inches wide and deep, inside measurement, made of wood or metal (cypress is the best wood and galvanized iron when made of metal). The drainage consists of three-quarter inch holes every twelve inches in bottom of box. The boxes should be one inch shorter than the width of windows to allow for air space on each end. For long porches or windows of unusual width it is better to make the boxes in

two or more sections.

Porch boxes should be two or three inches wider than window boxes on account of their drying out faster in the more open position in which they are usually placed. Before painting the boxes should be charred inside. This consists of washing with kerosene on the inside, both bottom and sides, then lighted and left to burn until a thin, charred coat is produced, when it is turned over and smothered; this will add many years to the life of the box. Before filling, the boxes should be fitted and proper fastenings provided. The proper color of paint is hard to give unless all the surrounding conditions are known. It is safe to use a deep green color if plenty of vines are used in planting.

As stated before, good soil must be used. This is best obtained through some florist, but can be made up as follows: Pasture sod, chopped fine, two bushels; rotted manure, one bushel; sandy garden soil, one bushel; bone meal, two quarts. These must be well mixed and made up in the fall for next season's use if possible. The bottom of the box should receive the drainage material, consisting of broken potsherds. place a thin layer of moss or excelsior to prevent the soil washing out. The coarsest part of soil is now put in, following with finer soil, until the box is two-thirds full. This will allow of deep planting. Start with the vines along the front, and place these along with the roots firmly packed in the soil, as the continued tucking by the wind is likely to loosen them, resulting in weak growths. In very exposed places it is well to have the boxes deeper to allow for this planting, also giving more protection to the roots of the plants. Next to the vines place the fillers, such as the Boston fern or asparagus sprengeri. In the back place the flowering plants. Geraniums are the most desirable plants for sunny positions. These should be of sturdy young growth, and one variety should be used only, as a mixture of colors, unless well chosen, will only give a patchy effect. The dark red geranium is a favorite; scarlet looks well in certain places, while the light shades of pink are to be carefully tried to avoid disappointment, especially on very dusty streets. For such position use smooth leaved plants, as many as possible, to prevent the dust sticking to leaves, and if the boxes are so situated as not to be washed by rains, sprinkle them over occasionally, to keep them clean of dust. There are other plants that can be used if carefully matched as to color of leaves or flowers, such as achyranthus and coleus, alyssum and ageratum, petunias and cannas. The last of the dwarf sorts, as Express, Chabonne or Austria, also dracenia and Yucca aloefolia, Phormium tennax, and the variegated form, make excellent center plants for large rustic stands and vases. Agaves and aloes are suitable for very exposed places.

In selecting lawn vases choose them of good size, say eight to twelve inches deep, and not less than sixteen inches in diameter.

Rustic stands or boxes of wood should be charred same as the window boxes, and should have a minimum depth of eight inches to do well. Also drainage must be provided, as recommended for window boxes. Special care must be used in draining iron vases, as some patterns are poorly arranged. When the vases are small, it is necessary to make the soil somewhat richer in composition. If heavy vine growth is desired, be careful to have the soil fully one inch below the top of vase or box. The last filling around plants should be of finer soil, and must be well firmed. Do not expect good results in loosely planted vases or boxes. If possible have them in some sheltered place where they can remain several days, and where they will be protected from heavy rains, as the soil must not be kept too wet. Until the roots have started well into the new soil, they must be sparingly watered, and yet it should never be allowed to dry hard. After a week or ten days it will stand more watering, and after three weeks or a month it can be soaked daily in dry weather in a sunny position. From this time on fertilizer can be used. at first, weak solutions of manure water, or a light dusting of the dry material. The watering must be looked after at regular intervals, and let me warn you, that good results can not be had with indifferent care. Also the old flowers and the dry leaves must be regularly removed; also see that vases stand firm and level.

Regarding the different vines, the Vincas, both the white edged and light green leaved sorts, are the most useful and best growers. The variegated honeysuckles and Senico scandens are other vines for yellow and green effects. They are of rapid growth and readily propagated, and will grow from four to eight feet long in an eight inch deep box. Where some climbing vines are desirable, the Cobeas, both the white and purple, will fill the bill. These can be trained up to porch columns and windows, and Maderia vine planted in the back of boxes can be trained to form a nice screen.

STERILIZATION OF GREENHOUSE SOILS.

A. T. ERWIN, IOWA STATE COLLEGE.

One of the most important problems with which the grower has to deal is that of subduing his enemies. So far as the general mastery of the situation is concerned, the florist has no complaint to make. Indeed there is no line of agriculture, using the term in its broadest sense, in which the operator comes as near being the real master of the situation as in the case of farming under glass. If the soil is too rich or too poor or too light or too heavy, he can add sand, plant food, or leaf mold and prepare it according to his own formula. If his plants need water, he does not need to watch the clouds or bombard the skies, but simply open the faucet. The temperature and other important factors are equally under his control.

However, with all this, he still has a number of important problems to deal with in the control of certain insects and diseases. Among the latter none are more difficult to handle perhaps than those which infest the soil. Of this class, there is one in particular which I desire to discuss for a few minutes this

evening.

Some five years ago we had growing in the college greenhouse a crop of winter tomatoes and cucumbers, consisting of the American and English forcing varieties. About the middle of the forcing season, about the time the heaviest set of fruit was ripening, the plants suddenly began to wilt and show signs of disorder. They bore a good leaf system; the foliage appeared to be green and healthy; the plants had done quite well up to this time and had a good set of fruit and everything seemed to be favorable. The soil was moist and in good condition, which

made the wilting all the more puzzling. The soil was washed away about the root system of some of the plants and it was found that they were badly infected with a club root growth somewhat like the club root of the cabbage. An examination under microscope revealed the presence of a small microscopic worm known as nematode, which was the real cause of the trouble.

This animal really belongs to the worm family and is, strictly speaking, not an insect. It is closely related to the vinegar eel, trichina of pork, tape worm, liver fluke and other creatures of bad repute.

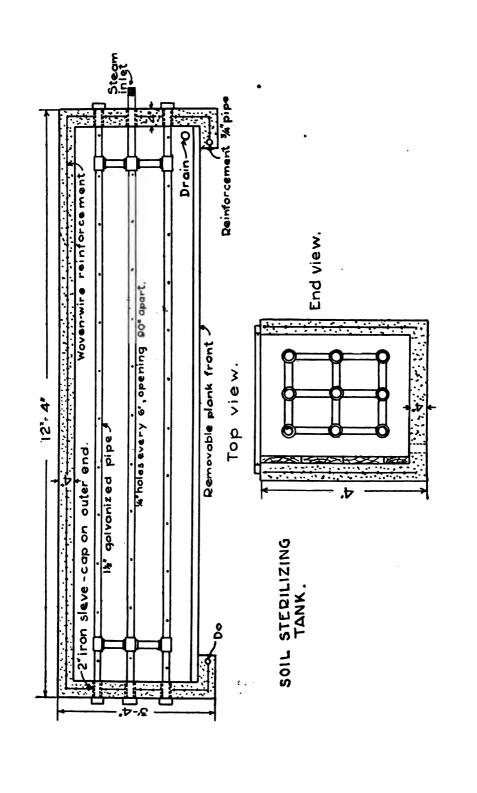
Its work is confined to the root system and the most serious injury comes not in a direct way, but through its interference with the absorbative function of the roots, hence the wilting of the leaves. As a result of their presence, the plant becomes weakened and enfeebled, often resulting in its becoming affected with other diseases.

The range of plants affected by the nematode is quite large and in our own experience the cucumber seemed to be affected the worst and the tomato next. Lettuce was not troubled. A number of the flowering plants such as roses and carnations are also inhabited by it.

As to methods of treatment, which is perhaps the point of special interest to you, we first tried impregnating the soil with certain chemicals such as nitrade of soda, lime, etc. These had but little effect and were not to be relied upon. We then tried a method recommended by Professor Stone of the Massachusetts Experiment Station, namely, that of steaming the soil: term sterilization, which has been widely used to designate this process, is really a misnomer. The term steaming the soil would really be more appropriate. In applying the treatment the soil is placed in a tank through which a number of steam pipes are run. These pipes are perforated every foot or less. After the tank is filled with soil and covered a pressure of about fifty pounds of live steam is turned into it for a period of about two hours. Through the accumulation of heat, a temperature of from 180 to 200 degrees is secured. This excessive heat destroys the eggs and live nematodes.

There are also certain other benefits accruing from this treatments. Eggs of plant lice and other insects are destroyed, as are also weed seeds. Certain spores of fungous diseases such as mildew are also killed, though it should be noted in this connection that the temperature is not sufficient to destroy the spores of some of the worst diseases the florist has to deal with, such as "damping-off fungous."

The treatment also has a good influence in rendering more available the plant food of the soil. Heat accelerates chemical



action and it has been noticed that when soil was treated the growth is more vigorous, due to the fact that the organic matter in the soil is more rapidly broken down and rendered available as plant food.

do praze zood.	
The cost of a tank such as we are using is as i	follows:
23/4 bbl. cement	4.95
21/4 yds. gravel	.55
4 16' planks	
23' 46" woven wire fencing	.65
135' 11/2" wrot iron pipe	14.85
3' 2" wrot iron pipe	.60
6 1½" T connections	.66
$2 \frac{1}{\sqrt{2}}$ T connections	.22
$1 \frac{1}{2}$ T connections	.22
17 $1\overline{1}/2$ " plugs	.85
9 2" caps	.90
·	

\$28.30

Figures are for tank 14'x4'x4'.

The tank we are at present using is made of wood, though in the appended sketch I have suggested the use of concrete instead. The top may be covered with hot-bed sashes as the work is done during the summer when these are idle. It will be noticed that on one side plank are used. This is quite a convenience, as they may be lifted and the soil shoveled out from below. A concrete tank of this kind may be readily constructed by any one. Ordinarily woven wire fencing is used for reinforcing the walls and inch piping at the corners.

HARDY HERBACEOUS PLANTS.

(Continued from the July Number, Page 203.)
ASTILBA.

Astilba japonica was introduced from Japan. It is also known under the name of Spiraa janponica, or Hoteia japonica. The plant forces easily and has been much in demand by florists for that purpose. It is worthy of a place in the border; give it rich soil and a moist, shady place, with plenty of water while in bloom, and you will be pleased with it.

BAPTISTA. Wild Indigo.

Baptista tinctoria, Wild Indigo, is an eastern plant with small yellow flowers that has been reported hardy.

B. leucantha, white, and B. leucophæa, with cream colored flowers, are native. These are good plants for the wild garden, though scarcely deserving a place in the border. June and July.

If tinctora is hardy, australis, with blue flowers, probably is, as it is native from Pennsylvania to Missouri.

BELLIS.

Bellis perennis, the English Daisy, is only half hardy here, but may be carried through winter with protection. Blooms from April to June.

BOCCONIA. Plume Poppy.

Bocconia cordate was introduced from China, is a stately plant and makes a fine specimen on the lawn; in sod it does not spread from the roots, but when planted in cultivated ground, where the roots may be cut or disturbed it suckers badly, or when plants are moved the cut roots continue to grow, unless every piece is taken out. Have had the plant on the lawn for twenty-five years and it has not spread the least, but on cultivated ground it is a nuisance. July and August. Have had no experience with microcarpa, which is also a native of China.

BOLTONIA. False Chamomile.

Boltonias are tall plants resembling asters.

Boltonia asteroids is a native plant with white flowers; not generally in cultivation, though found in eastern trade catalogues.

B. latisquama is native of Missouri and Kansas and hardy in the southern part of this state. Flowers blue or lilac.

Both species may be used in the wild garden.

CALLIRHŒ. Poppy Mallow.

Callirhæ involucrata, a native or introduced plant with prostrate hairy stems. Flowers in summer, two inches in diameter, usually crimson but sometimes white. The plants remain in bloom for a long time. May be planted either in border or wild garden.

CALTHA. Marsh Marigold.

Caltha palustris is the native Marsh Marigold of this country, and also of Europe. It was common on low wet prairie soil, but will also grow in dry cultivated ground. The sort with double flowers is the best. For the equatic or wild garden.

CAMPANULA. Bell Flower.

The Canterberry-bell is a biennial and is the most popular of all the Campanulas. It is generally reported tender, though it may be safely carried through the winter with protection.

C. carpatica is probably the hardiest of the perennial sort. A native of Europe that seldom grows over two feet in height, with blue or white flowers. July and August.

C. rotundafolia is the native harebell not only of this country but of Europe and Asia. This plant is probably the Blue Bells of Scotland and of English literature. It is the best of the three native species. June to August.

CARYOPTRIS.

Caryopteris mastacanthus is reported tender, and is not often planted. The roots, however, are half hardy as far north as Davenport, and with protection may be carried through the winter. It is from China. This plant is a small shrub; the top kills back to the ground every winter, but the new shoots grow vigorously and bloom freely late in summer, so it may be treated as an herbaceous plant. The clusters of small lavender-blue flowers are borne in the axils of the leaves.

Cassia. Senna.

Most of the Cassias are tropical plants, some of which are grown under glass in this climate for their light green pinnate

foliage and bright yellow flowers.

Cassia marylandica, Wild Senna, a native not often found under cultivation. It grows in moist sunny places and blooms from August to September. The Partridge Pea, an annual variety, is much more common in this state than the Wild Senna.

CENTRANTHUS.

Centranthus rober, Red Valerian, from southern Europe; tender, not often planted in the state.

CHELONE.

Chelone glabra, Turtle's Head, a native growing in dampground along streams. Not in cultivation. For the wild garden.

CHRYSANTHEMUM. Golden Flower.

These Chrysanthemums are usually known by the older gardener as Pyrethrums or Feverfews. We do not include the ten-

der garden forms of C. indicum and morifolium.

Chrysanthemum maximum. A large white daisy from the Pyrenees; often confused with C. lacustra, a moisture loving plant from Portugal. The latter species branches more freely and has larger leaves. C. maximum is reported hardy in the southern part of the state, but tender northward.

C. coccineum is also known as Pyrethrum roseum, a plant from the Caucasian region. This is one of the plants from which insect powder is prepared. There are many garden forms in

cultivation; most of them are tender in this state.

C. uliginosum, the Great Ox Daisy, is a northern variety of Pyrethrum from Hungaria. Hardy in the southern part of

the state, though tender at the north. A strong growing plant which needs plenty of moisture.

C. leucanthemum, the Ox-eye Daisy, has been introduced, but whether it will prove to be a troublesome weed in this state has not yet been determined.

CLAYTONIA.

Claytonia virginica, the Spring Beauty, is a common native plant in moist shady places. For the wild garden.

CLEMATIS.

Clematis should be planted in a rich, well drained soil, the surface of which should be high enough so that water cannot collect over the crown of the plant during winter.

Clematis davidiana. From China. A variety of C. heracleæfolia, is hardy in the southern, but tender in the northern

part of the state.

C. recta, from Austria and southern Europe, is not as strong

a grower as davidiana, but hardier; blooms in July.

C. virginiana is a native of the wayside thickets, blooms in July and August, which later give place to feathery akenes that are quite as attractive as the small white flowers. The Virgin's Bower is useful where a vine is needed to cover shrubbery.

- C. flammula is not entirely hardy, but sufficiently so to receive attention; it is from southern Europe. We kept a plant of it for about fifteen years by giving some protection in the winter. It should have a sunny location. It has white fragrant flowers in June and July.
- C. paniculata from Japan is a vigorous climber and the most popular of the sorts with small white flowers.
- C. viorna we have found in several places, and it seems hardy as far north as Des Moines. We believe it is worthy of more attention.
- C. coccinea is the scarlet leather flower from the South. Have had a plant on the south side of a building for twenty-five years where it has never failed to give an annual display of scarlet flowers and silvery carpels.
- C. lanuginosa and C. cærulea are the parents of many garden hybrids such as Jackmani, Henryi, Miss Bateman and other large flowering sorts.

CONVALLARIA,

Convallaria majalis, the Lily of the Valley, is so well known it scarcely needs mention here. An aggressive plant in the border. Does best grown in partly shaded places. Used extensively for forcing for cut-flowers.

COREOPSIS.

Coreopsis lanceolata, generally reported hardy in this state, but a little erratic at times. Does best on sandy soil; an excellent plant for cut-flowers.

(To be continued.)

FORESTRY AS A FINE ART.

C. A. MARSHALL.

The Japanese have a way of cultivating oaks in such a manner that they are always miniature and insignificant. They will take infinite pains and trouble for ten or twelve years to make an oak a dwarf; they put it into a pot without much soil; whenever an extra bud shows itself they pick it off and take no end of pains to dwarf and stunt the life of the growing tree. After they have carried on this work for some time, they have a little tree that looks like an oak seen through the small end of a telescope; perfect in itself, but small, minute and insignificant. The tree which grows in a pot might have spread its branches in all the glory of a monarch of the forest, giving shelter and shade to man and beast; it might have stood the tempest of a thousand years, but it is reduced to a dwarf and planted in a pot.

Is this not a true picture of the way some men are treating themselves? I had a neighbor who has a splendid grove of timber near his building lot, but it brought him no money and he had to pay taxes on it. He wanted the land to raise more corn, to feed more hogs; he cut it down, and today his children are vainly striving to raise a few shade trees to keep off the purgatorial fires which beat with the relentless fury of the summer solstice on that farm dwelling. It is this infernal greed for money which is depopulating our forests; tearing up our groves with the hand of the iconoclast and desolating the first temples of the Gods. Forestry as a fine art has no show in a land where the soil is valued simply for the money it will bring; where trees are estimated simply by the scale of the lumberman or the measure of the cordwood man.

Some men who have drifted into the back-waters of life can see but little fine art in forestry; still less has it for them either of pleasure or profit. They hear no music in the rustle of the trees; for the freshness of youth has faded, so Wadsworth sings—

There was a time when meadow, grove and stream;
The earth and every common sight
To me did seem
Apparelled in Celestial light,
The glory and the freshness of a dream;
It is not now as it hath been of yore.

How we pity the people who have lost their interest in the trees. Of them we fancy Byron's words must be divinely true—

And Ardennes waves above them her green leaves Dewy with nature's tear drops as they pass, Grieving if aught inanimate 'ere grieves Over the unreturning brave.

But the love of trees never grows old; the body may wax feeble and lose its vigor, but I have known the worn old man of seventy rise from his bed of sickness to tend his loved trees, they whisper to him as he passes; they sing to him in the glorious summer time. Truly, "There is no speech nor language where their voice is not heard." And when winter bleak and drear is passed; when the sun draws once more to the north and the soft southern breezes again visit the earth, then he feels the waking pulses of immortality and sings once more with the Concord poet—

Springtime makes spring in the mind When sixty years are told; Love wakes anew the throbbing heart, And we are never old.

Over a quarter of a century ago a friend in New York city took me to see the famous marble palace which A. T. Stewart had built for a dwelling; no money had been spared to make it the finest home in that city of palatial residences, but I noticed in an angle of the building an evergreen that had lately died, and I thought of some beautiful specimens of the same tree that I had seen growing in the shade of many a humble home of the west, and I said to myself, "The tree is no respector of persons; it responds to the tender touch of its friend in every place and climate; it will cheer the poor man in his poverty as well as the millionaire in his mansion. Surely forestry must be a fine art. It is a fine art when we consider the starting of the trees." "Oh," you say, "anyone can plant a tree; dig a hole in the ground and stick it in it, that's all there is to it," and yet, some of us are wondering today why some of our trees planted in the severe drought two years ago, grew and thrived while others went to the burning of the brush heap.

We call a tree inanimate, but I have often thought it speaks with wisdom's voice and says, "I love them that love me." Nothing responds quicker to the tender touch of the master hand than the young tree.

In the trimming and training of trees the work of the master hand may be seen. I do not refer now to the grotesque and ridiculous cutting and carving of trees into all manner of absurd shapes and forms; a trick as fantastic in its doing as the clipping of terrier's ears or the docking of a horse's tail. The plant that would soar heavenward is arrested in its flight like the eagle with clipped wing; its aspirations are thwarted, and the giant becomes a dwarf.

In the trimming and training of his trees the true master of the art of forestry shows his hand. Of all things animate in this world a lovely woman is beyond comparison the most charming and beautiful. Of all things inanimate, a stately tree standing in all its splendor of top and leaf is the most grand and glorious.

Men of Iowa! this is the work to which you are called. You find this state for the most part a treeless plain; be it yours to make it as the Garden of the Gods. You found it swept by cyclone in summer; by fire in autumn, and by pitiless blizzard in winter; be it yours to bar the ravages of the destroyer by grove and shelter belt. You found it a dreary waste unrelieved by aught save the wandering line of some far away fringe which marked the meanderings of the distant stream; be it yours to make the desert rejoice and the hills and slopes of our beloved commonwealth as the Eden where the spirit of nature loves to walk in the cool of the day. Some of us are on the shady—no—the bright side of life, our race here is nearly run, but the trees we planted last spring will speak of us when we are gone.

In my study I have a picture of the late Robert Douglas, of Waukegan; he was an Englishman, and brought his love of trees across the seas with him; and I never look upon that benign face without pleasure. Why? Many years ago he sent me by mail, for a nominal sum, a packet of evergreens; today they are stately trees, and the birds of the air lodge in the branches thereof; and somehow, summer or winter I never pass beneath those murmuring pines with their soft and soul-like sounds but what they whisper to me of the man who did so much to make forestry a fine art in our western states. Then plant more trees, for—

These shall live on when we are forgotten, Fruits of the harvest and what we have done, Thus, would we pass from earth and its toiling Only remembered by what we have done.

BEGONIAS.

These plants make a fine show when well grown. They have bright, clean foliage that is seldom attacked by insects or fungous diseases. The flowers are usually in large clusters, freely produced, and in color range through white to scarlet. The whole plant has a waxy appearance that is quite attractive.

Begonias are of easy culture and thrive best in a rich, warm soil with good drainage. They enjoy light and heat, but not direct sunshine except in the dark days in winter. As the leaves are large and face the light they may be grown on a shelf or bracket. There are many species and garden hybrids in cultivation, so we can only name a few of the leading sorts.

Rubra is a favorite everywhere, and is still one of the best. Its strong growth and the freedom with which it produces large, waxy, coral red flowers has won the esteem of everyone who cultivates the begonia. President Carnot is much like Rubra. Otto Hacker is a fine decorative plant with immense

leaves and large clusters of pendant flowers.

Among those with spotted leaves Diadema Robusta and Argentea Guttata show a silvery white variegation that is quite pleasing. Metallica is a somewhat shrubby variety with hairy stems and leaves and a metallic luster, though the flowers are not so pretty as on other sorts, but as an upright foliage plant is worthy of a place in the window. Manicata Aurea has beautifully blotched leaves, making it a very ornamental plant. Feastii has a thick, creeping stem, closely covered with large leaves that are olive-green above and red beneath. It is the best begonia for a hanging basket that I know of. It is robust in growth and a beautiful plant at all times, even when not in bloom. Sandersoni is a neat plant with scarlet flowers.

Weltoniensis is a useful variety; it is semi-tuberous, and partly deciduous; the leaf-stalk and branches are dark crimson and make a fine contrast with the leaves and pink flowers. Vernon is the best bedding variety, is also useful in vases and window boxes.

The tuberous rooted begonias do not thrive as well here as they do in a moister climate. They are summer blooming sorts and are used as bedding plants. They should be planted in well drained soil; give some shade and plenty of water on the soil, but not much on the foliage or flowers.

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IOWA HORTICULTURE

VOL. 1

OCTOBER, 1908

NO. 10

AUTUMN.

WILLIAM LANGHAM, CEDAR RAPIDS.

For the horticulturist, Autumn is kaleidoscopic in its strict demands and fitful moods. Each day gives a different picture, sometimes severe, sometimes somber, but often of surpassing charms. In it are found the fullness and glory of the year. The apple, among fruits the first and greatest gift to man in all the wide world, fitly rounds out the season's bounty. At times, however, the vineyard, queen of August and September, lags with

halting steps, to the very limits of safety.

But the crowning glory of the year from an artistic point of view, was in the lavish coloration of the foliage of our trees, shrubs and vines, when "life's fitful fever" was over. No king or queen ever went to bridal or to death in such gorgeous attire as did October. Such a wealth of colors, greens, yellows, reds, purples are seen but once in a lifetime. First the Virginia creeper reared its columns of flame in grove and wood. Then in kaleidoscopic succession came the ashes in purple. maples in vellow and scarlet, and the oaks in green and crimson. Such shrubs as the wahoo, the black haw, and even many of the thorns assumed the most brilliant dyes imaginable, while on every ridge, slope and glen were marshalled the scarlet legions of the sumacs. In the case of the hard maples, the usual color of the autumn foliage is an indifferent yellow with a very small percentage, scarlet. This season the yellow was of a deep, rich golden shade, while the scarlet, largely increased in amount, was equally pure and intense. I knew of many trees, every leaf of which was a lovely scarlet, constituting objects of transcendent beauty. The oaks, however, were, perhaps, the most conspicuous. Their dark green foliage was dabbled and dved in blood as though some battle cloud had drenched it in its crimson tide. while the glossy leaves in the shimmering sunlight reflected a sort of metallic iridescence that was indescribable. But the most striking and magnificent of all in this carnival of color was a Keiffer pear tree; each season as autumn approaches, the foliage of this tree changes to a most beautiful purple and crimson. This year yellow and red and scarlet were added, and my eyes. never rested upon such a wondrous and incomparable sight. Is it possible that bud or graft would transmit and petpetuate this grandeur in coloration?

October, in orchard, field and forest, is the culmination of a year's life and growth and death. Her richest jewels, bright as ever graced coronet or diadem, are born in the very throes of dissolution. What a diversified and interesting field for research and speculation! Every leaf is a mystery. Learned men tell us that the green color of leaves is due to a granular matter in the cells, called chlorophyll. But when this substance matures and dies, so to speak, what then? No one has yet dared-to say why this leaf turns yellow, or that one red, or that one purple, or that one scarlet. Nature guards her secrets well; she has drawn before the mystic shrine within her inner sactuary a veil impentrable to the ken of man, and over its portals she has written, "So far but no farther." Oh, science, thy name is vanity.

While the autumn care of many of our vines and shrubs and trees requires much attention, yet the end of toil approaches, and the greater leisure gives more time for reading and social functions. In every calling of life to which ours is no exception, retrospection is not only profitable but enjoyable, although failure in some lines has been our lot. Perfect success in an occupation so varied as horticulture is seldom vouchsafed to mortals.

But above and beyond all are the pleasures and joys which wait for us at our annual meeting. What horticultural lore and helpful hints and suggestions gained through experience and observations are crowded into these three short days! What courtesies and amenities! The kindly greeting, the hearty handshake, new affinities congenial and sympathetic, loyal hearts tried and true, well-wishes and final good-bys are not soon forgotten. Forgotten! I ought rather to say are enshrined in memory so long as life shall endure.

There is a deep and touching pathos in the desolation of late autumn. The song of birds is hushed and the flowers, one by one, have faded from the landscape. Indian summer like a beautiful dream rests upon the bosom of the earth, veiling hill and prairie in impenetrable mystery. Our forest and fruit trees and vines and shrubs, their allotted work of the season having been done, put on their varied and gorgeous vesture as for a holiday. Then the cruel biting frosts and the angry winds sweep this pageant of transcendent loveliness into the grave.

For me there is something in the shortening days and lengthening shadows, and this death-like repose of nature that induces not all utter despair, but rather a quiet and abiding content through faith and hope, for shall not the birds return on the zephyrs of the south, and shall not our orchard and floral treasures live again in the bright sunshine of another spring to gladden us with renewed life and beauty.

Is this quality of mind and heart a glimpse or presentiment of that sun-set on the horizon of life which shall forever close this earthly existence! Who knows?

ART OUT OF DOORS.

JOHN L. HANCETTE, M. D., SIOUX CITY.

This subject is so very broad and has so many phases, that I can only just dip into it a little bit. And first, I might say that in this age—in this day—it isn't an age, it is a day; things don't go by ages any longer, they go by days; today is different from yesterday and yesterday was different from the days before; we are going on in such rapid strides in so many things that we can not say now in this day and age, we must say in this day—so I will say in this day life has become worth so much, the values of life and its periods are so much, that we estimate our time and our work and our feelings and our experience very much more than we did a few days ago. A life is worth very much more than it was a little while ago, because we get greater values out of experience, because our feelings are more sensitive; day by day the evolution is going on very rapidly. The heart of man was once desperately wicked and deceitful above all things. I do not know as it is today. I believe that man now is a harp of a thousand strings; he has a thousand ears and a thousand eyes, and the feelings in the ends of his fingers are so magnified that he enjoys even with the end of his fingers. We can almost enjoy a rose with the end of our fingers. Did you ever read John Burroughs on the apple? He says he can enjoy an apple—he can almost tell the different apples in the dark by touch,—the wonderful joy of the apple in his fingers, the smoothness of the apple, the shape of the apple. We sense things most exceedingly now.

What is art? I can't tell you just what art is. It takes a critic, a poet and a prophet to tell you what beauty is. But our art, landscape art, outdoor art, the art we are speaking of this afternoon, to bring it down to a common-sense idea, is bringing nature to us in a pleasurable way, or going to nature and finding it pleasurable, because man has worked with nature. Architectural art and landscape art are of one kind,—the bending of nature to our use and happiness. The tree can not be our shelter or the raw prairie our garden. If a tapestry has taken time, if it has taken ingenuity, if it has taken feeling to produce it,

that is one reason why it is artistic; in fact, it is the principal reason why it is artistic. Tapestry is not of very much use to keep dust off the wall. The color in it the eye enjoys. But there is that more about it, because it required time and diligence and pains and ingenuity,—that is what put the greater joy into it; that is what gives us the greater joy in tapestry. Many a painting is enjoyable because of the great work that made it.

The sense of beauty that we have is unaccountable. We can. not tell why we enjoy things. It is instinctive, it is a primary constitution of the mind. I do not know how early it is that the child enjoys going into the field and seeing the wild grass and the little buttercups, those little buttercups that grow so commonly along the hedges. Why does a child enjoy these things? Why does an adult enjoy them? There is no possible way of knowing. It is a primary activity of the mind. It can be cultivated. Undoubtedly we can cultivate our love for the beautiful, we can cultivate our enjoyment, we can become more appreciative certainly; but to analyze the cause of enjoyment of what we call beauty is useless. Simply the fact that we do enjoy, that is enough to know. If you care any of you to go into the question, the philosophical question of why we love beautiful things, here is a book by a Yale college man, George Santayana, "The Sense of Beauty," a psychological study by George Santayana, of Yale college. The book is worth while.

But while all these things are going on so fast, and while we are becoming so much more sensitive and enjoying so much more, it is possibly proper for us to criticise and for us to analyze some of the works of man. I have outlined here a few little points that I might speak of. The first thing, of course, that a man must have is a place, anything that man makes to live in, our human abode, our house. Now, the question of how to get art into a habitation. If we analyze it carefully, it seems to me that it depends a good deal upon where we live what kind of a home we should have. It depends a good deal upon how much money we have to use to make a home that is suitable and that gives us pleasure. If I saw a home where a man was making a salary of \$75.00 a month, a home that had cost him \$6,000.00, it would give me pain if I knew the man had to live on \$75.00 a month and support that home. It is inappropriate, and a person should build a home, in order to make it artistic, in accord with his ability, in accord with his ability to support the home. That is the first principle of joy,—to build it, to be able to support the home. The materials put into it, the size of the home, and all that, must go along in proportion; in other words, we must keep things in proportion. I have often thought the architecture of our city produced during the boom times was mixed and unen-

joyable. The last few years they are building a square house with broad eaves, a compact house, a house that looks liveable from the outside, with very little filigree work. There are few towers being built now. I haven't seen a tower go up on a house in Sioux City for two or three years. What is a tower for? What is a tower on a house for in this country? There is no large outlook for us here, but a very little outlook in the main part of any city, and the towers do not have outlooks built in them. They are simply built for show and nothing more. What is a cupola? I remember about twenty-five or thirty years ago, or forty years ago, the good houses in Illinois were built square and in the top of the four-cornered roof there was a cupola, an outlook there. That was the common architecture in those days. There are a few in Sioux City today. That has all passed away, unless you might see on the deck of a house a little rail put around it. But what excuse is there for a tower or cupola on a house today? I lay at the hands of an architect who lived eighteen years ago the sins that are going to live in our city for the next twenty years,—Tower and towers, corner town:s, every house had a corner tower, simply for show.

Now, things to look at are not beautiful unless they are use-Utility and beauty always go hand in hand. It is absolutely so-utility and beauty-absolutely a first principle of our art. But it might be that there are some things in the fine arts that are simply for beauty, pure and simple, -colors, certain forms, curves, spirals. I think there must be a principle of beauty in the curve, in the spiral; but most of art is also useful. Here in our city we have a few stone houses. I think a stone house, a large house made of stone by people who are abundantly able to transport stone from Lake Superior or from some distant place, would make us feel comfortable; but if we knew the man was overdoing his pocket-book to transport stone to build a house, that would be sad, and we can not enjoy anything when we are sad. Therefore we must resort to some material which can be transported easily, which is cheaper and which can be had near at hand or made in situ. I have hopes that some artist is going to make good use of concrete in making homes that will be artistic, æsthetic, beautiful and useful. I must say that for some reason a brick house is not beautiful to me. I do not know why. I have no way of knowing why a brick house does not give me joy. Brick is a material at hand. A brick house is substantial, a lasting house, a permanent house. Permanence goes in with beauty also.

Then the contour of the country has something to do with the shaping of the building. I do not know why the Swiss made their houses so full of filigree and open work. It isn't a hot country; it is a cool country. I think it was a peculiar tendency

to the grotesque or picturesque, a trait of the Swiss mind fostered by long life in those rugged Alps, and had they had greater artistic inhibition, they would have at least built the picturesque into stone architecture. Picturesqueness is not art. grotesqueness is not art, ornamentation is not art. There must also be utility. Where wood is very plenty, as it is on the western coast, certainly wood should be used. In a place like San Francisco, where earthquakes are wont to come, then, of course, a wood building gives comfort and delight, because it is not going to be shaken down. Wooden houses in San Francisco are more artistic than they would be in Sioux City, simply because they are more useful. The farther south you go the wooden houses are less and less artistic. They crack under the sun's heat, and it gives you pain to see the sun dry them out. They are not useful, they are not appropriate, they are not artistic. They have to use something besides wood, so they use brick or adobe. The adobe house there looks artistic, its looks comfortable; you know it is cool. It is appropriate to the climate, hence adobe houses are artistic. The Spanish style of architecture in San Antonio just agrees with the kind of climate found there. In Holland the roofs are very steep, and they are built this way for a purpose. They have so much water there that they have to get rid of it quickly, so the roof is built very steep. A certain comfort in being sheltered by such a roof is the key to the composite with our sense of proportion and also with the entailing sense of utility. Flat roofs in a dry country and steep roofs in a rainy country.

Then we can go on and see the effect of religion in art, in places of worship. Leave the home and go to other institutions, institutions of commerce, institutions of education, institutions of work, factories. Even factories are having the agreement of grace and use inculcated into their very texture, as witness the wonderful Dayton, Ohio. It is simply an art gallery in workshops,—the whole city a veritable park. Every factory has windows so many that the day floods into the factory. worker in these factories is enjoying his year's work a little better because of the fact that it is in an artistic building, a great big building of stone, brick and glass, a solid, artistic place in which to work; and I might say that the two reasons why that horde of workers in Dayton are so healthy and so happy and so hopeful is because they are working in the midst of artistic surroundings,—the most happy community of working people in the world. Their grounds are all covered with flowers; their buildings are all proportionate. Even the machines they build are a thing of beauty and a joy forever. Dayton is the very forefront of outdoor art in America. Cleveland feels the effect of Dayton, and is pulling down a million dollars' worth of great stone buildings in the center of the city and making a plaza. I think something like six million dollars of buildings are being confiscated, you might say, to art, enjoyment and comfort.

I spoke about permanence a little while ago. If there is any one little thing I have ever done in my life that I have enjoyed more than another, it is planting acorns. I have got my own oak, almost as high as my head,—my oak, my oak, almost as high as my head, one of the happiest, best things I ever did in my life. Permanence,—the oak, the cedar, the elm,—permanence, utility, beauty and strength. Strength is beautiful, strength is beautiful, power is beautiful.

I haven't time to speak as I would like to in regard to planting around the home, around the factories, around the churches. O, I saw a beautiful little Episcopal church in Lake Forest. It grew out of the ground,—wild roses here, and perchance some dogwood here, lilacs here; some scrub oaks had reached up to drink the eave-drops from the shingle edge. The roof of slate, upheld by common limestone. But the whole edifice—it was small, grew out of the ground. The wild-rose border was the outer limit of not only the vestry, but the choir and the sacristy.

This garden is only a room outdoors, and I must say that I haven't the taste, or the assurance that my æsthetic taste has grown yet so I dare plant things where people can see them. It is only a very short time since I commenced the study of land-scape gardening. The very first thing I did when I got home was to plant two Blue spruce trees, exactly symmetrical on each side of my walk,—one here, one there. I have threatened to take them up for two or three years, but they have such a nice start that I haven't the heart to do it. The planting of evergreens at all is questionable.

Another thing I would like to speak of is bringing strange things too much to our lawns and gardens. People do not want to see strange things except in a place for strange things. The bitter-sweet and the wild grape we all know here; they grow here, and people will not be shocked by such growths. But the trumpet-vine might shock people. The wild hop, the wild clematis, the bitter-sweet,—why, I wouldn't feel at home without these plentifully planted about the porch. We have any amount of wild things that make home comfortable, natural. I wouldn't dare bring many strange things to my garden, unless I planted them way back out of sight, and would take my friends back and tell them in a whisper what they were. The common trees and vines and perennials of our wooded streams,-why there are dozens of things that can be utilized around the home and will not shock people. As soon as you plant the exotics you will estrange people.

I do not mind much whether people plant round beds of red

geraniums on their lawns or not. That is color, and color is beautiful; but it is a question whether it does not belong to the park, it is a question whether three or four dozen geraniums shouldn't be in the park. I can forgive anyone for making mistakes in taste when they are trying to do things that are for the beautiful. We should condone all of the mistakes in taste when people are trying to make things look better, because it is a purely unselfish thing. But the planting, the planting of the home ground is a simple thing. I think the last speaker made a wise remark when he said you should plan out your ground before you plant, have it all planned. That was a great mistake I made in my first work around my home. But those mistakes can be corrected. It is wonderful what nature will do. It is the difference between the fine arts and the live art—I like to call outdoor art the live art, especially landscape art. Nature does so wonderfully where the artist perhaps does only moderately well, nature will come along and do wonders in making beauty. I know that here are criticisms in regard to certain flowers and in regard to certain plants that others might not agree with. Here is a book by Mr. Morris, "Hopes and Fears for Art," Mr. Morris, of the Morris chair fame, an Englishman who did more perhaps to raise the ideals of art in England and in our own country than any other man. He gives a perfect tirade on the double rose. The wild-rose is much more beautiful than the double rose and much more fragrant, in fact, he says, we have got the double rose where it almost smells like a cabbage when it is boiling. I can hardly agree with Mr. Morris as to the effects of a double rose. But he has done much for art and his book is good.

"The Improvements of Towns and Cities,"—here is a classic by Charles M. Robinson. It is in all the city libraries. "The Improvements of Towns and Cities," really a classic.

Here is "Art Out of Doors," by Mrs. Van Ransaeler, a fine

thing, an old classic.

"Nature for Its Own Sake," by Dr. VanDyke, is another book that cultivates the love of the beautiful,—"Nature for It's Own Sake." Didn't he also write a book, "Art for Art's Sake?"

"The Outlook to Nature," by our beloved Bailey; this book and such as those I have just named, put into the hands of the young, the boys and girls of our time, would soon make a taste, an appreciation, an æsthetic nature, which we would see within a generation,—the building up of beautiful homes and parks and highways, beautiful factories and beautiful churches, the starting of Greater America.

COLD STORAGE AND THE APPLE INDUSTRY.

S. H. FULTON, WASHINGTON, D. C.

The remarkable development of commercial fruit growing in this country within recent years has been attended by great improvements in methods of caring for orchard products. advent of artificial cold storage has been one of the most important factors in this connection with reference to the handling of the apple crop. Only a comparatively few years ago practically all of the late apples preserved for winter use were kept in cellars, basements and common fruit storage houses. Under such storage conditions, temperatures could not easily be controlled, and fluctuations occurred as the weather grew warmer or colder. The greatest difficulty was likely to occur at picking time, when, if the weather was warm as was quite apt to be the case, the apples when stored continued to ripen until checked by cold outside temperatures, and the subsequent durability of the fruit was very much impaired. It was often very difficult under these conditions to hold even the best keeping varieties for late winter and spring use. Long chances had frequently to be taken by buyers and growers who stored their fruit, and the result was that rather than take the risk of loss, the bulk of the crop would be put upon the market within a few weeks after picking. This meant, in a full crop year, a period of over-supply attended by low prices.

The advent of cold storage within recent years has done much to change this situation. A system of warehouses artificially cooled has sprung up throughout the country for the purpose of handling fruit and other perishable products. In these houses, properly managed, the temperature can be absolutely controlled regardless of the condition of the atmosphere outside. In a modern cold storage house, the ripening of the fruit can be checked within a few hours after it is stored, and the low uniform temperature afforded makes it possible to preserve winter apples for months with little or no loss, providing the fruit has been properly handled prior to being stored. The development of such a system has done much to promote a feeling of security in the apple growing industry. The markets can be uniformly supplied throughout the winter and spring months, and the whole apple business is given a stability which has done much to foster the growth of the industry.

At the present time, most of the commercial cold storage houses are located in the large cities of the country, but there is a growing tendency toward the erection of more cold storage houses in the apple producing districts of the United States. This movement has been most prominent in western New York,

where there are now more cold storage houses located than in any other fruit growing district in the country.

Mechanically cooled cold storage houses are quite expensive to construct and operate, and as a result we find an exceedingly small number of such houses built and equipped by orchardists themselves. Most growers do not have the necessary capital, and those who have usually prefer to sell their fruit at picking time rather than go to the trouble and expense incurred in storing the crop. The cold storage business is almost entirely in the hands of warehousemen, usually city men with capital, who do a general warehousing business in the storing of butter, eggs, meat, poultry, etc., aside from handling fruits, thus keeping their houses in constant use the year around.

Although most of the artificially cooled houses for the storing of farm produce are located in cities, still it is not uncommon to find upon the farms in some sections of the country storage houses cooled by ice or ice and salt combined. Such houses are usually small, seldom having a capacity of more than 500 to 1,000 barrels, and are best suited to the needs of small growers who have a special market for their fruit. These farm storage houses can be operated successfully only in sections of the country where an annual supply of natural ice can be secured. They are more or less objectionable on account of the excessive amount of moisture which usually exists in the rooms, poor air circulation and difficulties attending the regulation of the temperature. With ice alone, a temperature lower than 40 degrees cannot readily be secured during warm autumn weather, and this is 8 to 10 degrees too high for most kinds of fruit. By the addition of about 5 to 7 per cent by weight of salt, the temperature can be reduced to 32 degrees, but the difficulties occasioned by excessive moisture and poor air circulation still exist to a con-Recently, however, a new style of storage siderable extent. house known as the "Gravity Brine System" which possesses special merit for the farm has been developed. In this type of house, crushed ice and salt are placed in an overhead ice bunker through which run coils of pipe connected with secondary coils in the rooms below. Calcium chloride brine is used in the pipes, and the brine circulates by force of gravity. As the brine cools in the primary coils by contact with the ice and salt mixture, it settles into the coils in the rooms below and warm brine rises to be cooled in turn, and thus the circulation is effected. With this style of house, a low uniform temperature can be readily secured, and the humidity of the rooms is under as perfect control as with the mechanical or chemical system.

The keeping of apples in cold storage depends not alone upon the proper management of the house, but also upon conditions surrounding the growing and handling of the fruit. The latter factor really gives the grower who stores his fruit much more occasion for concern than the former. Fruit grown under favorable local conditions, sometimes will not keep well even under the most skillful management of the storage house, and well grown fruit may have its keeping qualities greatly impaired by injudicious handling. In the experiments of the Department of Agriculture, it has been found that the type of soil, age and vigor of tree, maturity of the fruit when picked, and method of handling the crop, all have an important bearing upon the keeping of apples in cold storage. Certain winter varieties grown upon sandy land usually ripen earlier than the same varieties grown upon clay. Fruit from young or rapidly growing trees is apt to be overgrown, and it does not keep as well as fruit grown upon old trees with steadier habits of growth. Mature fruit keeps fully as well or better than immature and is worth more money in the market. The method of handling is probably the most important factor of all. Fruit injured in picking is very apt to decay after picking, the keeping quality of the fruit is greatly impaired, especially if the weather at picking time is warm.

TIME TO PICK.

Apples designed for cold storage should be picked when they reach a well matured hard ripe condition. If picked too green, the fruit fails to ripen, and the flavor upon withdrawal from storage is very poor. Certain varieties are much more subject to scald when picked in an immature condition than when allowed to come to full maturity on the tree. If overripe when picked, the life of the fruit in cold storage may be greatly shortened. The question of the proper time to pick depends not alone upon the variety, but also upon the conditions under which the fruit is grown. Apples upon sandy land are frequently ready to pick a week or even two weeks earlier than the same varieties upon clay. Similar apples in sod usually ripen earlier than in cultivated orchards. These facts have a practical application, particularly in the case of apples designed for cold storage. the more mature fruit is picked first, and that which is least mature last, more uniform keeping quality and greater market value will be attained. In the case of certain varieties which ripen unevenly, it may pay to take the apples from the trees at two or three pickings in order to get the fruit at the right degree of maturity. The value of well matured fruit for cold storage and market is getting to be better understood, and buyers arebecoming more discriminating in this respect. A large New York: firm which this past season bought thousands of barrels of York: Imperial apples throughout the Shenandoah Valley of Virginia. required many of the growers to make two pickings. At the first

picking only the full grown well colored fruit was taken off, the green undersized fruit being left upon the trees for a later picking. The value of certain early varieties, such as Oldenburg and Wealthy, may in many instances be considerably increased by following this practice.

CARE IN HANDLING.

A thorough study of the problems involved in the keeping of apples in cold storage reveals the fact that careful handling is of the utmost importance. Most apple growers look upon care in handling as essential mainly because the appearance of the fruit is injured by bruises and other blemishes, but from the cold storage standpoint, another and still more important reason for careful handling exists. Most diseases or rots common to stored fruits, possesses little power of penetrating a sound unbroken skin. In a recent laboratory test with blue mold, one of the most common apple rots, the spores of the fungus could not be induced to penetrate the skins of perfectly sound apples even under the most favorable condition of heat and moisture. Under commercial conditions, the damage from this disease is, to say the least, very small upon sound fruit. If, however, the fruit is bruised, cut, punctured or otherwise injured in handling, the spores of the blue mold and other diseases gain entrance and decay soon follows.

Under the present methods of handling the apple crop in the eastern states, it is not uncommon to find 40 to 50 per cent of the fruit injured in some way in picking and packing, even in the orchards of the best growers. The picker leaves his finger marks upon the fruit, the skin of the apple is dented or punctured by contact with the sides of the picking basket, and bruises and other injuries increase as the fruit is emptied upon the sorting table and rolled into the barrel. Frequently as high as 10 per cent of the apples are punctured by contact with the stems of other fruit in the picking bag or basket. juries, particularly finger nail cuts and stem punctures, may be so slight as to entirely escape the notice of the orchardist, yet they afford entrance places for rot spores, and account for a great deal of the loss from decay in cold storage. By careful observations extending over a series of years with a large number of varieties, it has been found that practically all of the decay in winter apples which takes place in cold storage early in the season is directly traceable to skin and flesh injuries. Later in the season, when the fruit weakens by age and over-ripeness. decay may occur without any of the above predisposing causes.

QUICK HANDLING NECESSARY.

The importance of handling fruit quickly is coming to be

better realized. When fruit is taken from the tree, the ripening processes are quickened, and if it is to be shipped a considerable distance, or is designed for holding in cold storage, it should be handled with the least delay possible. Apples delayed in transit or at the orchard usually break down much more quickly in storage, and, in the case of bad scalding varieties, scald much worse than when stored immediately after picking. This accounts for many of the differences which develop in the keeping of apples of the same varieties in cold storage. Frequently one lot of apples will be found to be showing signs of weaknesses and decay early in the season, while another lot, possibly from the same orchard, is still firm and sound. When such differences occur in fruit grown under the same conditions, it is usually safe to infer the fruit which first shows signs of breaking down has been delayed at the orchard, in transit, or at the storage house before being stored. Two weeks delay in warm weather may shorten the keeping time of the fruit by two months or more, and if the effect of the delay is overlooked and the fruit is allowed to remain too long in storage, it may mean all the difference between profit and loss to the owner. The effect of delay is most pronounced in warm weather and with early ripening varieties. With cool weather at picking time, the effect of delay is much less noticeable.

PACKAGES AND WRAPPERS.

Most winter apples are stored in barrels, some are held in boxes, and a few in open crates. If the atmosphere of the storage rooms is fairly moist, so as to prevent shriveling in the open crate, there is no great difference in the keeping of common winter varieties in the different styles of packages. In the case of some of the tender fleshed early varieties, however, the box has some special advantages over the barrel, for the reason that the apples cool down more quickly in storage and there is less weight of fruit to crush the tender flesh of these varieties. Such fruit can be held longer in storage in boxes than in barrels, for though quite ripe when removed, the weight of fruit is not too great to admit of handling with safety.

The value of the wrapper should not be overlooked by the fruit grower who raises fancy apples of choice varieties, and who wishes to put his fruit upon the market in the soundest and most attractive condition possible. The wrapper takes up slack in the package and prevents bruising. It renders box packing of apples easier, because the fruit can be more readly adjusted to the package. In the storage house, the wrapper preserves the brightness and attractiveness of the fruit and tends to prevent the spread of rot. It prolongs the life of the fruit. Comparisons have been made of the efficiency of tissue, parchment, un-

printed newspaper and waxed paper, with no apparent difference. A double wrapper is a little more efficient for long keeping than a single wrapper, and a good combination is an absorbent newspaper next to the fruit with a more impervious paraffine outside.

THE VARIETY.

So great has become the importance of cold storage in relation to apple culture, that the value of any new winter apple will in the future be judged largely by the way in which it keeps in cold storage. Among the varieties now commonly grown, the greatest variation exists as to keeping quality in cold storage. Some varieties are much more subject to scald and decay than are others, some while still apparently sound on the exterior. are found to be brown and discolored within, some get soft and mealy after a few months, others crack open and become worthless, some fade in color and thus lose in market value, still other varieties keep so perfectly that they can be held in storage a year or more with little apparent deterioration. The value of certain early varieties, such as Oldenburg, Wealthy, Grimes Golden and Jonathan, has been greatly increased by cold storage. Wealthy, for example, which used to be regarded as an apple for early fall use only, can now be kept until January or even later in cold storage. Oldenburg can be safely stored for from two to three months, while Grimes Golden and Jonathan can be kept in good commercial condition throughout the entire winter. This should mean much to a section of country like northern Iowa where the common commercial varieties of winter apples do not thrive, but where Oldenburg, Wealthy, and other hardy early varieties succeed. With these varieties in cold storage it should be possible to have a supply of home grown fruit in northern Iowa throughout the greater part of the winter season.

LOCAL NATURE OF COLD STORAGE PROBLEMS.

Many of the cold storage problems are local in their nature, and should be worked out in each well defined apple district in the country. The questions of influence of type of soil, methods of caring for the orchards, and picking, packing and shipping the fruit, influence of age and vigor of trees, adaptability of varieties to cold storage, these and other problems should open up a field of work giving valuable results for the apple growing interests of Iowa. It is our understanding that such work is now under contemplation to supplement the preliminary work already done by the horticultural department of the experiment station of this state. Such a movement should elicit the hearty cooperation of the Iowa State Horticultural Society and of all apple growers throughout the state.



THE HARD MAPLE.

The Hard Maple takes high rank as a shade tree. It is not quite so rapid in growth as the Silver Maple, but much superior to it for decorative purposes, and its wood has a greater commercial value. Bird's-eye and Curly Maple are much in demand for cabinet work. Who is able to determine that a tree has this kind of wood before it is cut down? Would it be possible to establish this curly condition of growth by any process known to man?

The Editor's Page.

These are days of unsual activity in the garden. There is not only the planting of the early blooming, hardy perennial plants for next year, but the saving of tender plants like cannas, dahlias, gladioli, tuberoses, caladiums, callas, trigridia, amaryllis, erythrina, tritomas, tuberous begonias and other bulbous plants that must be lifted and put away in some frost proof place to keep them for next year's planting season. When frost has killed the foliage we cut the stem off close to the surface of the soil with a scythe, then carefully dig the roots and let them dry awhile in the sun to remove the earth clinging to them; they are then taken to a frost proof shed and the drying process continued until they are ready to put away for the winter. Some roots dry too much if exposed to the air of a dry room all winter; these should be wrapped with paper, or packed in dry sand. The drying of the thick stem of the caladium may be hastened by removing the outer leaf-stalks as they dry. Gladioli are as easily kept as potatoes, with about the same treatment, perhaps a little warmer. Dahlies should be handled carefully so as not to break the fleshy roots from the base of the stem; they are easily kept in a dry cellar. The large flowering cannas keep better with the soil on the roots or packed in dry sand; they dry out too much when exposed to dry air all winter. Bulbs may be cleaned by rubbing off the dry roots, stems and bulblets during leisure hours in winter. The tuberose usually has many small bulbs attached; these should be taken off; if needed for stock the larger ones will grow big enough to make blooming bulbs in one year; the smaller ones will require two years' growth before they are large enough to bloom. The same is true of the gladiolus.

Lemon verbena, Chinese hibiscus, Lemon grass, oleanders, lantana, donax, crape myrtle, pomegranates, and other tender or half-hardy plants may be lifted with earth about their roots, put in boxes and stored in a light cellar where they will not freeze and they will keep in good shape for planting in the spring. I have found this the best treatment for eulalias and Helianthus soliel de'Or when used as bedding plants; they grow with more vigor when divided and planted in fresh soil.

When picking potatoes we often find the large green tomato worm in all stages of its transformation to the pupa condition.

At first it contracts to about one-half its length, becomes rigid, brown in color that finally suggests a varnished mahogany wood screw with a jug-handle attachment. Does its fat, sleek body suffer any throes in the change? Has its instinct, half reasoning, been disturbed by thoughts of giving up its habits of riotous living when admonished by an early frost, or the scarcity of food, that it is time to descend into the cold ground and there squirm through the winter of its discontent? Nature is full of object lessons from which the distraught agriculturist may take comfort or point a moral. Years agone when we grew ten acres of tomatoes these worms were numerous. The skunk was a valued assistant in reducing their numbers. Each day as we gathered the ripe fruit there was fresh evidence of the nightly vigils of this much maligned animal where it had dug out these ripening worms after they had gone down two or three inches into the ground. The skunk seemed to prefer them in that stage of ripeness. We have no encomiums for this midnight marauder. but there is no creature that has sunk to the depths of infamy that has not performed some service worthy of commendation.

How beautiful is the foliage on many of our native trees and shrubs when they have completed their season of usefulness and are matured ready to fall. The color effect produced in the landscape by the lush, umbrageous foliage with which summer clothes our tree-crowned hills, cannot compare with the beautiful, rich, warm tints which autumn gives to them. How the yellows, scarlets, crimsons and maroons glow on a dark-green background when lit up by the mellow rays of an October sun. How happily is the garniture of nature suited to the different

In spring, the fresh green grass, the swelling buds, the gray-green that runs along the willows, and the vivid verdure that overspreads the larch, suggest joyous activity, but in autumn, the hues that tint the field and forest are restful, thoughtful, satisfying.

seasons of the year, and to what man needs to stimulate him to attain the highest development, or to supply his daily wants.

What a charming combination of colors we have when nature does the planting. I have often thought, when looking across the river at the bluffs which slope down to it, why so little of the rich material which those hills could have supplied, had been used in planting about our homes. The native trees, shrubs and vines are better suited to our soil and climate than the many exotics that have been planted and failed. Have we neglected to plant them because they were common? We are prone to seek after rare and untried sorts, hoping to find something better than we have; instead of trying to improve our native varieties.

As most places are now well protected by windbreaks, the necessity for planting rapid growing trees no longer exists, and all further effort should be directed toward securing wood of more economic value, and to improve the beauty of the land-

scape.

The oaks are all stately trees, and their woods are more or less valuable. The white oaks are good trees to plant for timber, but the red oak group is superior to them in brilliancy of their colored foliage in autumn. The Scarlet oak, Q. coccinea, is the best in the list. Its leaves turn to a bright scarlet or yellowish red that is pleasing. The Yellow oak, Q. velutina, is a variety of the black oak group of large size, its foliage is large, dark, glossy, and abundant. It is not so desirable as the scarlet or red oak.

The foliage of the Red oak, Q. rubra, is less brilliant than that of the scarlet oak, having more of a crimson or purplish hue. The Pin Oak, Q. palustris, is a small tree with light green foliage. Its branches are nearly at right angles to the bole. It is a grace-

ful tree and sure to please where an oak is wanted.

Oaks are not easily transplanted when large, but if they have been transplanted in the nursery when small they can be moved without much loss. If they are to be grown from acorns, these should be gathered as soon as they fall, and planted at once, for they do not retain vitality very long after they are dry.

Hickory-nuts, walnuts, butter-nuts and chestnuts should be gathered in the fall, put in damp sand and buried where they will freeze and then planted early in the Spring, or planted at

once in a bed prepared for them.

Our nut bearing trees should be more extensively planted. It is good for the health to crack nuts and jokes together during the long winter average of the long winter and power to the long winter the long winter are the long winter and power to the long winter the long

ing the long winter evenings.

In the fall, the color of the foliage of our nut bearing trees is not very attractive, but occassionally we do get very pleasing, orange yellows from the hickory trees.

The hazelnut is quite an ornamental shrub, specially in the fall when its leaves begin to color, and its nuts supply many a

sweet tid-bit through the winter.

The Virginia creeper is the best native vine that I know of for covering walls, stumps or trees. The brilliant crimson of its foliage is not surpassed by any vine grown in our climate. The orange and scarlet berries of the Bitter-sweet are very showy in autumn and early winter.

WINTERING OF HALF-HARDY PLANTS.

HENRY LAU, DAVENPORT.

Those engaged in gardening for the love of it are apt to be led into a policy of expansion; they are unwilling to be without the many fine things that are only half hardy, and the very risks and difficulties connected with their culture, seem to add to their desirability.

When it comes to wintering large trees like the magnolias, catalpas, English walnuts, tulip trees, paulownias and many evergreens, not much can be done after they attain size. However, they are tenderest while young, especially during the first winter after having been planted. While young and pliable they may be laid down and covered; when once well established they have more resistance and must take their chances.

There is one indispensable condition to the wintering of plants and that is well ripened wood. Many facts can be brought forward in evidence, thus peach buds, which in our latitude, under favorable conditions, will endure a temperature of 15 to 20 degrees below zero, sometimes get killed by the mild winters of the Puget Sound country. The Willow Twig apple, which is fairly hardy with us, is not always able to resist the moderate cold of English winters. The sickly condition of grapevines that have been allowed to overbear, is due to the immaturity of their canes, and the dead tips that are often found in the spring on many spireas, the weigelia, ailanthus and even on our canoe birch, may be traced to the same cause.

It would appear that when trees and shrubs fail to mature their growth in this latitude, it is because they are of a warmer climate, and that our summers are too cool and too short for them. Now it has been claimed that you can move your place three hundred miles south by providing sufficient shelter such as furnished by evergreens. Of course, during a still, cold winter night it will probably be as cold within this enclosure as outside of it. But the injurious effects of a drying winter wind would be broken, the temperature of the growing season would be raised and with it the aggregate amount of heat received by vegetation. In proof of this it may be remarked that on the south side of a building Catawba grapes will ripen by the fifteenth of September, while those in the garden very often will not ripen at all. Even a tight board fence makes quite a difference. The object desired can be further promoted by planting in a well drained soil, rather clayey, lacking in humus, but rich in potash and phosphates; by giving cultivation in the earlier half of the summer and subsequently discontinuing it, and, where grapevines are concerned, by some judicious summer pruning.

Having furnished the above conditions we can go a step further and provide covering. For there is a class of plants, herbaceous perennials, shrubs and vines, that can endure considerable cold, as long as it is uniform, but which are destroyed by alternate freezing and thawing, no matter how well matured their wood may be. Among bulbs, the onion is a familiar example; if kept in the frozen state all winter and gradually thrawed out in the spring, it will come out perfectly sound. A field of winter wheat that has survived the severest cold under a covering of snow, when made bare by February thaws, will often be killed by the comparatively moderate temperature of March. It is the change of frost and thaw, the strong sunshine and drying winds of spring that work the mischief. The only time that the Turner raspberry was killed to the snow line on the writer's place was during an open winter, and also a Prairie Queen rose that had been left uncovered: everything above the ground was winter killed, excepting one cane, which had grown into an adjoining evergreen; in this case, protection from the winter sunshine was the saving cause. Many shrubs and plants require but a moderate covering to break the force of sudden changes, among them are grapevines, dewberries, flowering plum and almond, Japan quince, fragrant honeysuckle, Deutzia gracilis, flowering currents (red), altheas, yucca, and most of the roses; also many herbaceous perennials.

What material shall we use for covering? Grapevines and dewberries are generally covered with earth after having been straightened and laid on the ground; this will be found sufficient, except in dry, cold and snowless winters like the one of 1898-99. Dead leaves are the protection that nature furnishes, and while the frost will penetrate them while they are loose and dry, yet when packed by rain and covered with snow, they afford enough protection for many plants. It is a good plan to have them gathered in a sheltered corner so as to be available when wanted. Clover chaff is a good non-conductor; a stack of it can always be got at during the winter, in case additional covering is needed. It will mold and heat when it gets wet, so it is best to cover first with leaves, and chaff on top of them; should the winter remain snowless and get very cold, extra protection may

be given by putting on manure.

Quite a few plants can be wintered in the cellar, such as agapanthus oleander, laurel, tritoma, fig, hydrangea, fuchsia, orange and lemon, bride's myrtle, lemon verbena, century plants, pomegranate and crape myrtle. They should be looked after every week or two, and watered when necessary. While this should not be overdone, still they must not be permitted to become dust dry or they will be dead in the spring. A cellar that is light, cool and dry is preferable.

But pansies, roses, wallflowers, carnations, daisies, campanulas, digitalis and half hardy primroses will not remain dormant in the cellar; it is better to give them protection where they grow outdoors. In connection with the above, fig, hardy orange, crape myrtle and pomegranate have been, with suitable protection, wintered out doors by the writer. It is recommended to place a frame around the bed, then the shrubs are gently bent and fastened to the ground. This may be done in the last part of September, so that during frosty nights temporary protection may be given in the shape of blankets; the permanent covering should be put on as late as possible. It is recommended by some gardeners to first cover with waterproof paper, and leaves on top of that. This will of course keep things dry from above. but the moisture from the soil will rise and condense. things are uncovered in the spring, everything will be reeking wet, and carnations, campanulas, hollyhocks and wallflowers more or less decayed. It has been suggested to admit ventilation by having a pipe on each end, to be opened during a mild spell.

It will be early enough to lay down shrubs, climbing and remontant roses, in the first week in November. It is well to get everything pinned down in good season, before the ground gets frozen. The cover may be put on later. While there is no difficulty in getting vines close to the ground, and while the grasses, like Erianthus and the Eulalias, are readily cut off close to the ground before covering, some shrubs are hard to get into a horizontal position, and some, like the crape myrtle, are quite brittle. Where this is the case, the earth around the crown must be loosened or removed and it may be necessary to trim some of the roots that are near the surface. It is advisable, when such shrubs are first set out, to trim the roots into such a shape that they may be readily laid down, even if they have to be tied to a stake in the summer.

Some poisoned corn should be placed with the plants to prevent mice from barking your roses and shrubs. When the covering is removed in the spring, it is well to leave things pinned down for a while, especially those that are most tender, so that in case of a cold snap they can receive temporary protection. Generally in this latitude the last week in March is the time for the cover to be removed from the crocus and tulips; a hard freeze will not injure them. About the middle of April, the grapevines may be lifted and then roses can be trimmed and tied up to stakes or trellis. No hard and fast rules can be laid down for the time of doing this work in either spring or fall; seasons will be different, and the judicious horticulturist will adjust his work to existing conditions.

HARDY HERBACEOUS PLANTS.

(Continued from September Number, Page 285.)

CROCUS.

Crocuses are hardy spring flowering plants. The corms should be planted early in October, as they are impatient with delay, and will not grow or bloom well the next season if planted late in the fall.

Crocuses should have full sunlight. The flowers are white,

blue and purple.

Crocus aureus and C. vernus have given most of the garden varieties offered by seedsmen.

CYPRIPEDIUM. Ladies' Slippers.

Cypripediums are shade and moisture loving plants and will not thrive under the same treatment given cabbages or tomatoes. The best place to grow Ladies' Slippers is in a shady location near a spring or pond, where the soil is cool and moist; but drained sufficiently that water does not stand about the roots. The soil should be well filled with humus.

C. acaule, Purple Moccasin Flower, has not been reported as native of the state, but is hardy under good treatment. Flowers

greenish purple and pink.

C. reginæ, Showy Ladies' Slipper, has fragrant, pink and white flowers, and is the best one of the group. It requires more water than the other sorts.

C. candidum, C. hirsutum and C. spectabilis are all worthy of attention by those who admire these quaint and curiously shaped flowers.

DELPHINUM. Larkspurs.

Larkspurs are hardy, tall growing plants that will thrive in almost any location and soil, but do better in a deep, rich, friable loam than in a hard impervious clay that has not been enriched with barnyard manure.

Delphinum formosum. From the Orient. One of the best

hardy blue flowers for garden culture, or the lawn.

D. grandiflorium, and its garden forms, from Siberia and China, are desirable hardy sorts.

D. tricorne is a pretty native species, worthy of a place in the garden.

DIANTHUS.

Dianthus is the divine flower of ancient gardens, and is still a favorite among florists on account of the beauty and fragrance of its flowers. D. barbatus is the Sweet Williams of grandmother's garden.

A native of Asia and southern Europe.

D. pulmarius, Garden or Grass Pink, of Europe, has given many garden forms, with single and double flowers. They are not entirely hardy and should have some protection in winter, it should be loose and airy so as not to smother the plants.

D. chinsusis, Chinese or Indian Pinks, grow and bloom so freely from seed the first year that it is usually better to treat

them as annuals.

DICENTRA.

The Dicentras are of easy culture; bloom in May and June; should be planted in the fall as they start to grow quite early in the spring.

All the Fumariaceæ with succulent stems look like fragile, delicate plants that would easily succumb to the attacks of frost,

but are much hardier than they appear to be.

D. spectibilis, Bleeding Heart, a native of Japan and Siberia, is most commonly met with in gardens, and is the best one of the genus.

 \bar{D} , cucultaria, Dutchman's-breeches, is a native that is worthy

of a place in the wild garden.

DICTAMNUS.

Dictamnus alba and rubra. Gas Plant. Generally reported tender in this state.

DIGITALIS. Foxglove.

The Digitalis is a stately plant from western Europe, and has a commercial value for the medicinal property it contains.

It is used by herbalists in heart and kidney diseases.

The garden forms of the Foxglove (*D. purpurea*) have large flowers that resemble those of the gloxinia. Unfortunately these plants are not entirely hardy in this state and should have some protection through the winter. Cover so the crowns will remain dry; treating them the same as you would the best strains of hollyhocks.

DODECATHEON.

Dodecatheon meadia, American Cowslip, or Shooting Star, is a native plant with flowers resembling those of the cyclamen. It is worthy of a place in the border.

DRYAPTERIS.

Four species of shield ferns are found in the state.

- D. thelypteris is the most common in low wet ground.
- D. goldieana occurs in rich woods.

ERIANTHUS.

The Plume Grass, E. ravennæ, grows from six to seven feet in height, is hardy and serves às a substitute for Pampas Grass in decorative planting in this state.

ERIGERON.

There are five or six species of the Fleebanes that are native to the state; they are usually regarded as weeds.

Erigeron speciosum, from California and Oregon; is reported tender.

ERYTHRONIUM.

Dog's Tooth Violets are neat little plants that bloom early in the spring; they are worthy of a place in a shady border. Should have a winter mulch. The Yellow and White Adder's Tongues are native.

EULALIA.

Hardy ornamental grasses from Japan, useful for bedding or in the border; they grow from four to six feet in height.

E. j. zebrina, Zebra Grass, has yellow bars half an inch wide

across the leaves.

E. j. variegata has a white stripe lengthwise on each side of the midrib.

E. j. gracillima univittata has narrow leaves with a white midrib.

EUPATORIUM.

Eupatoriums are moisture loving plants. The hardy species have some medicinal value. Our early recollections of the effects of boneset tea have not entirely faded from memory.

Eupatorium agratoides. White Snake Root is native. Grows

best in moist, shady places.

Boneset, E. perfoliatum, and Joe-pry-weed, E. purpureum, also belong to this group. For the wild garden.

EUPHORBIA.

Euphorbia corollata. Flowering Spurge. Native in dry soil. An aggressive weed with small white flowers. Used in limited quantities as a cut-flower.

FUNKIA. Plantain Lily.

Plantain lilies are from Japan; they should have a deep, rich loam, and partial shade.

F. subcordata is the best one of the group. A selected form

of this with extra large white flowers is sometimes called grandiflora.

F. sieboldiana has darker leaves and a shorter flower stalk and smaller flowers than sub-cordata.

F. ovata has blue bell-shaped flowers:

F. lancifolia has narrower leaves and lighter blue in its flowers than ovata.

Garden forms of lancifolia have leaves with white margins. These are known in the trade as alba-marginata and undulata.

GAILLARDIA. Blanket Flower.

Gaillardia aristata is native of the western plains. It is a good plant for the border and its flowers are useful for cutting.

G. grandiflora is said to be a cross between aristata and picta. The strain does not seem to be well fixed, as we have had flowers showing both types.

GYPSOPHILA.

There are several of these stitchworts with small white flowers.

G. paniculata is the most commonly met with in gardens and is the best of the group. It has large panicles of small white flowers which are useful in boquets and design work.

HEMEROCALLIS. Day Lilies.

Day Lilies are of easy culture, and hardy. They bloom in June and July; prevailing color, yellow and orange.

Hemerocallis flava is the common Lemon Lily; is hardy and

most desirable of the species.

H. fulva, Tawny Day Lily, is the one commonly met with in gardens.

H. dumortieri is a double orange-yellow that is better than

fulva.

H. thunbergii is a tall growing species that blooms in July; the flowers are lemon-yellow and sweet scented.

H. kwanso has double orange colored flowers.

Other garden forms are worthy of a place in the border.

HELENIUM. Sneeze-Weed.

Helenium autumnale. A native growing in moist places. For the wild garden; occasionally used as a cut-flower. Generally classed as a pernicious weed.

HELIANTHUS. Sunflower.

Sunflowers are coarse plants, but their bright yellow flowers give color to the August and September landscape.

Helianthus decapetalus. This species is native, and has been cultivated for sometime. There are a number of garden forms; the two best are known as Multiflorus Flo. Plena, and Soliel d'Or.

H. orgyalis. This species is from the dry plains of the southwest; is hardy. It has long spikes of bloom that make quite a show in the wild garden.

HEPATICA. Liver-Leaf.

The Hepaticas are early spring flowers that should be planted in rich soil in a sheltered, shaded location.

H. acuta is native; bluish-white flowers, often with a tinge of pink.

HEUCHERA.

Heuchera sanguinea, Coral Bells, is an attractive plant from New Mexico; not often planted; should have protection as it is not entirely hardy.

HIBISCUS. Rose Mallow.

The Hibiscus have large flowers resembling those of the hollyhocks. They bloom in August and September; are hardy in the southern half of the state.

. H. moscheutos and H. militaris are native.

There are several garden forms, of which Crimson Eye is the most popular.

HYACINTHUS.

Hyacinths are native to the Mediterranean region. These bulbs do the best when planted in a rich, sandy loam. Nearly all the stock sold in this country comes from Holland, where hyacinth culture is given special attention. Many named varieties are offered in bulb catalogues. The bulbs are hardy, but are benefited by a mulch during winter to prevent alternate freezing and thawing, which is harmful to them.

IBERIS.

Iberis sempervirens, from southern Europe. Tender in the northwest; should have protection.

IRIS.

This is a large group of moisture loving plants, except perhaps the oncocyclus and xiphion types, which require a dry soil while dormant.

1. germanica (common in central Europe) is the one best suited to the climate of this state. Many garden forms are offered in plant catalogues. They are all hardy.

I. lævigata (Japanese Iris) is less hardy than the German sort. They are later and come into bloom during the hot, dry weather of summer, which is unfavorable for Iris. The plants should be set in a moist place and protected from strong winds. There are many garden forms offered in trade lists.

1. versicolor is the native Flag found growing along streams

and in ponds of the state.

I. pumila is a hardy dwarf sort of which there are several garden forms.

LATHYRUS.

Lathyrus latifolius, Everlasting Pea, is hardy and is worthy of a place in the border or for planting among shrubbery. White or rose colored. July to September.

LAVENDULA.

Lavendula vera. Common Lavender. A shrubby species from southern Europe with light colored leaves. Tender and needs protection. Not often seen in this state.

LIATRIS. Blazing Star.

Blazing Stars are tall growing plants with long spikes of bloom.

Liatris spicata. This species is more commonly seen in East-

ern gardens.

L. scariosa, L. squarrosa, and L. cylindraca are the most common species in this state. Good plants for the wild garden.

LILUM.

Lilum candidum is the common Madonna Lily. Not entirely hardy; should have protection. This variety starts growth in the fall, and should, therefore, be planted in August so it may become well established before frost kills the foliage.

L. speciosum. This is a Japanese species and is next in hardiness to Tigridum. There are several garden varieties of this

species.

L. tigridum is the hardiest of all lilies and is more frequently

seen than any other species.

L. auratum, Gold Banded Lily, is hardy but does not appear to be long lived in this climate, and new bulbs should be planted frequently to keep up the supply.

L. philadelphicum, a native species that is worthy of a place

in the border.

L. canadense, the native meadow lily, deserves attention.

LOBELIA.

Lobelia cardinalis is native; found growing in wet ground. Was quite common along the margin of sloughs and ponds before the prairie sod was broken. Somewhat tender on dry soil and needs protection in the garden.

L. syphilitica is the native blue Lobelia. This species grows in wetter soil than cardinalis, and has larger flowers. Both

species are suitable for planting in the wild garden.

LYCHNIS. Campion.

Lychnis coronaria, Mullen Pink, and L. flos-jovis, natives of southern Europe, are tender and need protection. The perennial forms are not long lived and the supply should be kept by sowing seeds annually.

Old gardeners generally refer to them under the name of

Agrostemma, but they are now grouped with Lychnis.

Haageana and Viscaria with rose colored flowers are known as the German catch-fly. They are tender and need protection in this state.

MERTENSIA.

Mertensia virginica, Blue Bells. A native of easy cultivation; enjoys a moist location. An early spring flower. Suitable for border or wild garden.

Monardia. Horse Mint.

Monardias are aromatic plants of easy culture.

M. didyma. Fragrant Balm is not native to this state, though found in the eastern part of the country. It is less hardy than Bergamot, but the flowers are brighter and make a better show in the border.

M. fistulosa. Bergamot has pleasing foliage and is an excel-

lent plant for the wild garden.

Muscari. Grape Hyacinth.

Muscari botryoides is a hardy, spring flowering bulb that does well in a half-shady border.

Myosotis. Forget-me-not.

Myosotis palustris is generally reported tender. It should be planted in a moist, partly shaded location, and given protection in the winter.

(To be continued.)

THE CANNING OF FRUIT IN GLASS AND THE PRESERVATION OF FRUIT JUICES.

FLOYD BRALLIAR, STUART.

In the majority of homes fruits are canned in glass jars, and this is as it should be. Fruit canning is so common that many will feel that a paper on that subject is superfluous; but I venture something that I hope may be of interest even to so august a body as the Iowa State Horticultural Society.

Fruits owe their palatableness and, therefore, their commercial value, to certain volatile oils they contain which please our palate. These differ in every variety and species, and are usually driven off by heat. It is for this reason that cooking changes the flavor of most fruits so very much. For this reason it is very important to cook fruits in the can, and in a sealed can at that. One who has never practiced this method of canning has little idea of how delicious canned fruits may be.

For cooking I use a common wash boiler (the largest size). I make a false bottom of wooden slats of any desirable thickness, and prefer to have wires or cords attached to the ends to enable

me to lift the hot jars from the water when cooked.

Place the fruit in the jar raw, and sift the proper amount of sugar through it. If it be peaches, blackberries or raspberries, I use one cup of sugar to two quarts of fruit. Pack the jar full and fill to the top with water. Place the rubber and lid on jar loosely. Lower jars in the boiler and fill in enough water to come to the neck of the jar. As soon as the water becomes hot it will drive the air from the jar and the lid should be screwed tight. Now cook the fruit properly and treat as by ordinary methods. Be sure to cook long enough. An hour for everything but soft berries is none too long. The fruit should, and will if properly treated, retain its form and color to a remarkable degree, and while heat will change the flavor slightly, it will be of very much better flavor than it is possible to secure in the ordinary way.

Cherries, plums, apricots and gooseberries require a half more sugar, but should be treated in a similar way. Cranberries and rhubarb are simply placed in the jars, filled with cold water, screwed down, and set away without cooking. Strawberries should be pressed into the jar quite firmly, or they will shrink too much. The same is true to a lesser degree with apples

and raspberries.

I have purposely cut this part of my paper short, and some may for that reason think it of little value. To such all I have to say is, "Try it yourself." "The proof of the pudding is in the eating."

Fruit juices are among the most wholesome and palatable of drinks, and should be canned and used extensively in the homes of the land. Perhaps one reason they are not more widely used is the lack of knowledge of their proper preparation.

Boil the fruit to be used in an open vessel with a fair amount of water, sweetening to taste before boiling. Drain off the juice and let it cool. A precipitate will form in the bottom, varying from a small trace in the cherry to a great amount in the grape. Strain the cool juice through a cotton cloth; heat and can in jars that have been previously sterilized thoroughly. In the second cooking the juice must not be heated over 200 degrees. This is important, for if it is heated too hot a precipitate will form again and the product will be much less desirable. On the other hand, if the juice is not heated to at least 180 degrees it will not keep, and for this reason it is always better to use a thermometer.

The most desirable juices are grape, cherry, blackberry, raspberry and apple, in the order named. In making grape juice the remaining pulp may be put through a colander and will make excellent butter or marmalade, so there is no waste.

In canning cherries, especially those of stronger flavor, in the old way, their quality is improved rather than injured by cooking with and removing a reasonable amount of juice. The juice may be removed almost entirely and new water added, the fruit reheated, and canned. Of course judgment must be used so as to not remove all of the flavor from the fruit.

After removing a reasonable amount of juice from blackberries and raspberries, the remaining fruit may be used in making a fair quality of jam.

I prefer to use good fresh apple cider to cooking the entire apple, and the price is ordinarily so low that it may be had in abundance by all.

TO ESTABLISH EXPERIMENT STATIONS IN NATIONAL FORESTS OF THE WEST.

Forest experiment stations will soon be established in a number of the national forest states of the West, according to plans which have just been completed by the United States Forest Service. These new stations are expected to do the same for the development of American forests as agricultural experiment stations have done for the improvement of the country's farms.

One of the most important parts of the work of the new experiment stations will be the maintenance of model forests typical of the region. These areas will furnish the most valuable and instructive object lessons for the public in general, for professional foresters, lumbermen, and owners of forest land, and especially to the technical and administrative officers of the National Forests.

The study will be carried on largely by means of sample plots, which will be laid out for future observations to determine the effects of grazing, of the different methods of cutting and disposing of the brush, and of other factors on the success of reproduction.

Other studies which will be taken up soon are a study of the light requirements of different species at different altitudes and the construction of a scale of tolerance which will be based on the actual measurements of the light intensity, and not only, as has hitherto been the case, on general observations alone; the taking of meteorological observations to determine the effect of the forest upon temperature, humidity, melting of snow, wind velocity, etc.; a study of the relative value of the germinating power of seeds from trees of different sizes, ages, and degrees of health; and similar studies of value to the region. A complete collection of the flora of the forest will be made to form a herbarium, which will be kept on the forest and will be available for reference at any time.

These stations will carry on scientific experiments and studies which will lead to a full and exact knowledge of American silviculture, and the indirect benefits of the forest, and will deal particularly with those problems of particular importance to the regions in which they are located.

The new system provides for the permanent assignment in a given region of specially trained men who will have an opportunity to become thoroughly familiar with their region, and the work will thus be conducted with the greatest effectiveness and least expense.

The work will be not only scientific in character, but will also be extremely practical, and will aim in every case to solve problems of most importance to the lumberman, the forester, and the people as a whole. Valuable results will undoubtedly be obtained in this way which were not possible under the old system of general observations.



SILVER MAPLE.

The Silver Maple has been more generally planted for shade and as a wind break than any other tree in the state. It is a rapid growing tree capable of adapting itself to almost every condition of soil and treatment. Few trees would have survived under the treatment given the Silver Maple. Many a grand old tree has been maimed beyond repair by the cruel tree butcher. The wood of Silver Maple is not durable in contact with soil. More than twenty years ago we built a hay barn with wood obtained from these trees and it has stood the test remarkably well.

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"MUMS."

The time is near at hand when the chrysanthemum will be queen of flowers, and right royally will she reign.

When you have seen twenty-five to fifty of these large flowers in a vase, you will have something to think about, and perhaps, to dream of.

There was a certain woman living in town who came to a flower show, and when she beheld the large blooms her heart went out after them, and she called the man of flowers and said unto him, Will you sell this plant with the large bloom? And he said unto her, Yea. And he bargained with her for fifty pieces of copper. Then she took the plant and hastened unto her house, for she was glad, and said unto herself, Now I will have large flowers, even as they who grow them.

When spring came she planted it in the garden, and many sprouts came up, and she hoed around them; and watered them; and watched over them that no evil thing should come near unto them, or touch them.

And when the shoots had grown very tall they lay upon the ground, and many branches came up, and buds came out of them; and when the woman saw the buds she rejoiced and said, Now will I have many large flowers. Now when the flowers were open they were very small, and when she perceived it her countenance was fallen, for her heart was sad.

Then was her anger kindled against the man of flowers, and she put on her outer garments and sought the man of flowers that she might chide him for this evil thing that he had done unto her.

And when she had come near unto the man of flowers she lifted up her voice and cried: Oh, thou wicked man! Why hast thou dealt deceitfully with me? Did I not give unto thee the price thou asked for a plant with large blooms? And the plant which thou gavest me has brought forth only small flowers. But the man of flowers was a mild mannered man, and waxed not wroth, for he answered the woman, and said unto her: I have done no harm unto thee, nor have I done wickedly by thee. Then he took the branch which she had brought in her hand,

and when he found a plant like unto it, he said unto her: Do you not see that the plant which you bought is like unto this one? And when she perceived that it was so her pride was touched, and she would have bowed to the earth; so great was her humiliation that the man of flowers had compassion on her and said: I will tell thee wherein thou hast not done wisely in this thing. And a part of what he said to the woman is here recorded.

He told her that she should have taken a sprout, or cutting from her plant instead of using the old root. That to grow large specimen plants for exhibition florists sometimes take cuttings as early as December, but that any time would do until June, but that the later the cutting was taken the smaller the plant would be. That it took less care to root cuttings in March and April than later when the weather was warmer. That it took less attention to grow nice plants in the garden, but a great deal more care to lift and pot them so they would not lose part of their foliage and prevent the development of perfect flower buds. That when plants are kept in pots all summer they should be plunged in coal ashes, or earth, up to the rim of the pot to keep these from getting hot and killing the tender roots of the plant. That to grow a good specimen plant you should have in mind the shape desired; then pinch off the leading shoots to form branches where needed, and to rub off those not wanted. That as few stakes should be used as possible to keep the plant in shape. That to have large flowers all except one at the end of each branch should be taken off. That the plant should have plenty of nourishment and all of its energy directed toward developing the buds. And many other like things did he say unto her. And as they communed together the sun went not down on their anger.

PHENOLOGY.

MISS C. M. KING, AMES.

Phenology is the chronology of plant-life history, in correlation with external influences of light, heat and moisture. Under this head may be discussed rightfully the present growth, the time of appearance and disappearance of leaf, the appearance and continuance of bloom, the time of ripening of fruit, the period of rest required for the seed, and the time of germination. It is accepted beyond need of further demonstration that the succession of events in a plant's career, as well as facts of its structure, have been determined by the dominant conditions of its development as a species, and heredity is simply the setting of the seal upon the result of these influences.

That alterations in the conditions of light, heat and moisture disturb the regularity of times and seasons of plants is familiar to all; for special instances, note the second flowering of snowballs, maples and other plants after a fall of protracted warmth; also the assuming by an annual of the temperate regions, of the perennial habit in warmer regions; also the formation of double rings of growth of many trees in the hot season of 1894.

Whilst some plants are less exacting regarding temperature; than are others, the northward and southward extension of plants is governed by thermal limits, so we have the cotton belt, the corn belt, the wheat belt, depending mainly upon the need of these respective plants for warmth. In mountainous countries, temperature governs vertical distribution of plants as well. So we see each species knows its own heat optimum for the growing period.

The amount of moisture in the soil and air is universally recognized as a determining condition for normal development of cultivated varieties; this is just as essential with wild or native kinds. Note the various adaptations of plants which nature has made for localities differing in amount of available moisture. This is exemplified in zones of vegetation at the water-side, in the differences in plants, in swamps, meadows, hilltops and

deserts.

Of the effect of heat, light and moisture in modifying plants, Darwin cites many instances; he uses for special illustration the dahlia, the melon, the heartsease, and some strawberries. Bailey accepts the conclusion of another writer (H. S. Williams); "The search has been for some cause of the variation" (i. e., divergencies seen in different species). "It is more probable that mutability is the normal law of organic action, and that permanency is the acquired law." Mr. Bailey further says, "I believe, therefore, that the greater part of present differences in organisms are the result, directly and indirectly, of external stimuli, until we come within the range of psychological effects. The variations are as definite as the changes in the environments are, which determine and control their existence."

That plants are modified by conditions we recognize in our common practice; in methods of seed planting, in the care and cultivation of plants, in hot bed and greenhouse culture, in disturbing the soil; in shading; in watering, and in many means of protection we employ. We are sure, too, of the effect of cold and cloudy weather, of rain, of sunshine upon the retarding and hastening of plant growth.

With reference to the bearing of the subject in hand upon

^{*} Darwin. Plants and Animals under Domestication. 2:263.

^{**} Bailey, L. H., Survival of the unlike, 22.

the improvement of cultivated varieties, I wish to present a portion of the original account, doubtless familiar to all, of the

* Trophy tomato.

After describing the crossing, which produced a large, smooth tomato, with firm, convoluted flesh, the writer continues: "This tomato is the result of twenty-four years' crossing and careful selection. Every year it has been grown under the most favorable circumstances, and the very best of each year's crop has been saved for seed. By a continuance of the same treatment, it may, no doubt, be further improved. On the other hand, it may be made, by simple neglect, to revert to the original type in onehalf the time that has been required for its development. planted in poor or cold land, and in exposed situations, it will rapidly deteriorate, and by the selection of the worst specimens of a crop so grown, for planting under similar circumstances the second year, a crop may be produced which will not show one of the good qualities of this really perfect fruit. Treated tenderly, well warmed, well fed, well watered, and sheltered from cold winds (as all tomatoes should be), the best results may be permanently secured, for it has a fixity of type rarely seen in any vegetable which is produced by seed." Here, we see about equal stress laid upon selection and environment.

In the light of facts, such as these verified by experience in the development of the cultivated tomato, and all other cultivated plants, observations to determine the physiological constant for different species of plants are of unquestioned importance. Our knowledge of phenology of plants has not been reduced to scientific terms; and so the experience of one observer is as yet of very little avail to others.

Data regarding humidity, rainfall and sunlight, as well as data regarding temperature, are essential to accurate conclusions in study of effect of climate upon plants. With a knowledge of plant behavior in relation to climate, laws of natural distribution of species will begin to appear.

In the cultivation of plants with this knowledge, we shall better understand the choice of varieties for different localities, selection and planting of seeds, the eradication of undesirable plants, the maintenance of standards of excellence, and the modifications of plants to greater usefulness and beauty.

Such research is necessarily not a labor for one, but for many; and all observations of this kind are valuable as contributions to our knowledge of plant life, and as such, are worthy of preservation.

^{*} Bailey, L. H., Survival of the unlike, 483.

VEGETABLES AND FRUITS.

MARY A. SABIN.

The human body is composed of sixteen different elements, which must be supplied by the food taken. The human being cannot avail himself of the elements directly as can the plant, but must feed at second hand by feeding on the plant, or even at third hand when using animal food. Not in the form of elements then do we receive our food, but in the form of proximate principles—these proximate principles being five in number, the proteids, the carbohydrates, the fats, the salts and water. Proteid is found in many forms. The lean of meat is almost entirely proteid and water,—the white of egg also is proteid and water. We find proteid in the curd of sour milk, and in wheat. The proteid in wheat and rye is elastic in nature, making the utilization of these flours possible in bread making.

Carbohydrate exists in the form of cellulose, of starch, and of sugar. The cellulose is the skeleton of the plant forming the membraneous partitions and enclosing the minute starch granules. Sugar is carbohydrate in circulation and is soluble, while starch is the insoluble stored up carbohydrate. The third proximate principle—fat—is found in both animal and vegetable

food.

The use of the proteid in the body is to build up tissue and repair waste, while the carbohydrates and fats furnish heat and energy. Perhaps it is better to say that each proximate principle has a favorite role in the body; the proteid—tissue building; the carbohydrate and fats—heat and energy yielding; though proteid may supply heat and energy and the carbohydrates and fats may build up tissue.

The characteristic of animal food is its large proportion of proteid or tissue building material and of fat. The chemical composition of beef in per cents is: water 64 per cent; fat 21

per cent; proteid 14 per cent.

The characteristic of vegetable food is its richness in carbohydrate or heat and energy producing principle.

We have a practical classification of vegetables as follows:

(1) Cereals, grain bearing vegetables.

- (2) Legumes, pod-bearing vegetables, as peas and beans.
- (3) Roots and tubers, as potatoes.(4) Green vegetables, as cabbage.
- (5) Fruits and nuts.

(6) Fungi, as mushrooms.

The composition of wheat is in per cents: Water, 14.5 per cent; proteids, or tissue builder, 11 per cent; starch, 69 per cent.

Beans have per cents as follows: 13 per cent of water, 23 per cent proteid, 52 per cent starch, 2 per cent fat.

Potatoes have 75 per cent water, 1 per cent proteid, 18 per cent starch.

Green vegetables, as cabbage; and fruits, as apples, have about 85 per cent water, 1 per cent proteid, 6 per cent sugar, 2 per cent cullulose.

Mushrooms have 90 per cent water, 3 per cent proteid, 2 per cent starch.

In each vegetable is present, also, cellulose and mineral matter, and in some cases fat.

The first two classes of vegetables, then cereals and beans and peas, have a high nutritive value. The third class, potatoes, has a very much smaller proportion of nutriment, while the last three classes, green vegetables, fruits and mushrooms, having toward 90 per cent of water, cannot be considered valuable for their nutriments, but rather desirable for the flavor and for the salts and acids they contain.

Chemically these vegetables would seem to be satisfactory, furnishing the body with the proximate principles. However, sawdust and kerosene likewise contain proximate principles and yet cannot be used as food. We have then to consider farther, digestibility and absorption of these materials.

The digestion of food is accomplished by two processes mechanical and chemical. By mechanical means the food is broken up into small particles and softened; by chemical means it is reduced to a simple substance ready for absorption. These two processes continue through the various stages of digestion. The first stage is mechanical simply, the chewing and mastication of the food and mixing of the mucous with it. If mastication is complete the succeeding digestive changes are brought about more easily-Gladstone's old rule of submitting every morsel of food taken into the mouth to thirty bites is one well worth following. The second stage is digestion, insalivation, brings into play both processes, mechanical and chemical. The chemical process affects the carbohydrates only, other foods are simply further moistened and softened mechanically by the mucous and the saliva. The agent of the saliva affecting the carbohydrates chemically is an unorganized ferment called phtyalin. It changes the insoluble carbohydrate, starch, to its next simpler form, soluble dextrin. Because of the absence of phtyalin in the saliva of the young child, starch is not used in its food, and food preparations containing starch are very undesirable. In fact. France has a law which forbids the feeding of solid food to a child under one year of age. By swallowing, the food is introduced into a muscular bag-shaped receptacle which churns and rotates it, mixing it with the gastric juice and passes it on a semi-fluid mass into the small intestine. Both mechanical and chemical processes have been at work in stomach digestion.

Chemically, however, just as in salivary digestion, only one class of foods has been affected. In this case the proteids, as meats, white of egg, curd of milk, and gluten of wheat have been changed. In the former case the carbohydrates only were offected chemically. In the small intestine, which is really the important organ of digestion, all classes of food are acted upon and digestion is completed. Throughout the digestive system all foods are acted upon mechanically. Chemically, starches only are acted upon by the saliva; proteids or the tissue building principle only by the juices of the stomach, while the proteids, carbohydrates and fats are all three acted upon chemically in the intestines.

With animal food the question of digestion is one belonging primarily to the stomach. With vegetable foods, whose nutrients are composed largely of starch, the problem is of the small intestine, rather than the stomach. We abuse the stomach in many ways as by failing to give it rest which it, like every other muscle, needs by using irritaing foods and by taking food in greater quantity than the digestive juices can cope with. Ralston's advice to take a stomach stretcher (a very hearty meal) once a day, we are most of us ready to follow.

When we say food is digestible, we mean it is a food taken care of easily by the stomach with no attendant discomfort.

We have just seen that all foods are churned in the stomach. Beside this mechanical process, meat is affected chemically too—digested chemically. One authority lays down as a rule that the greater amount of chemical digestion occurring in the stomach the easier the mechanical digestion takes place. The fact that both processes are concerned, accounts for the easy digestibility of meat. Raw meat remains two hours in the stomach; cooked meat three hours. As to absorption, it is practically completely absorbed and very small residue left in the intestines.

Taking next the vegetables—bread remains in the stomach two hours and twenty minutes. From experimentation it appears that it is well absorbed. Of solids only 4.5 per cent is unabsorbed; of the proteid 20 per cent is unabsorbed. The carbohydrate is similar to proteid of animal food in being quite thoroughly absorbed. As to the imperfect absorption of proteid in bread, the only explanation forwarded is that the quantity of starch existing in the wheat lessens absorption of proteid, and that intestinal movement is accelerated by acids appearing after fermentation of starch occurs.

Whole-meal bread, according to experiments, is less completely absorbed than white bread. The cellulose present in large quantity is supposed to account for this fact; the cellulose making it impossible for the digestive juices to reach and attack the nutritive properties. Possibly, too, the coarse meal, by hastening

peristalsis, or movement of the intestines, hurries on the contents before sufficient time has been allowed for absorption.

Pulses, as beans and peas, are found to require four or four and one-quarter hours before leaving the stomach for the intestines. Their absorption in the intestines depends largely upon the method of preparation. As ordinarily cooked as much as 40 per cent of the proteid is lost.

Potatoes boiled remain in the stomach for a shorter time than bread of same amount—two to two and one-half hours. In form of a puree potatoes are more digestible than in any other way. Intestinal absorption of potatoes is very complete, containing as they do a small amount of cellulose and a large amount of starch.

Cabbage remains in the stomach three hours. In the stomach the cellulose renders green vegetables difficult of absorption. Except when very young, cellulose is utterly indigestible. The bulk also enters into the question.

Ripe apples require three hours and ten minutes for stomach digestion. Absorption of fresh fruit is supposed to correspond with that of fresh vegetables. The degree of maturity enters into the case largely, the acids and hard cellulose of immature products delaying digestion.

Stomach digestion of fungi, as mushrooms, is difficult. The large amount of cellulose accounts for this, in part; also cooking causes them to shrink and form a compact indigestible mass. Absorption of mushrooms is very incomplete, 33 per cent of the proteid being lost.

Vegetable foods then tax the stomach by throwing upon it a large amount of mechanical but little chemical work, while with meat the labor is divided between the two processes. In general, the digestion of vegetable foods in the intestine being good if vegetable food has small bulk and small amount of cellulose. Four-fifths by weight of fruit and green vegetables is water, and dry vegetables take up three times their weight in cooking, so that nutriment obtained does not correspond to bulk. Bread is an exception to this, as has been said already. Cellulose, unless very young, is not capable of digestion. It is useless itself, and because of its presence the digestive juices cannot gain access to the nutritive elements contained within the cellulose. As to bulkiness—with too great a mass the digestive juices cannot cope; also the mass causes intestinal movement, hurrying on the contents before absorption has occurred.

Absorption of vegetable foods in general is incomplete. It is interesting to see that the proteid is least perfectly absorbed. Just why, we cannot tell. The large amount of starch in the intestines seems to prevent it, while the fermentation of the starch produces acids and probably quickens intestinal movements.

We have already dwelt upon one phase of digestion, digestion occurring within the body, called internal digestion. Sedgwick emphasizes other processes, really digestive, occurring outside the body and distinguishes them by the term external digestion. The very first stage in the process has to do with environment, the separation of the animal, or food substance, from its surroundings; the roots are dug; fruits are gathered; animals are caught; the grain is reaped, threshed and made into flour. All these working toward one result, absorption in the body. Thus far this digestion has been accomplished by agriculture and the mechanic arts. The housewife now takes it up, adding her part to this process for external digestion. Her part is the cooking, and this has several purposes, rendering the food more digestible, developing flavor and destroying any germ life present.

While cooking increases the digestibility of vegetable foods, it does not of animal foods. In fact the digestibility of animal foods is lessened thereby. Raw beef, for instance, is found by investigation to require less time for digestion than cooked. The flavor developed in meat, however, by cooking may stimulate the digestive juices and possibly render it as easy of digestion as raw meat. Coagulation of the proteid results with cooking of the meat. The point at which coagulation occurs is 170 degrees Fahrenheit. If higher temperature is used the result is hardened, shrunken substance difficult of digestion. The proteid of vegetable foods is affected in the same way but is less serious, owing to the small proportion of proteid in vegetable foods.

Digestibility of fat is less affected by heat than are the proteid and carbohydrates by high temperature. However, important changes occur and fats are separated into their constituents, one of which is a fatty acid irritating to the mucous membrane.

As to vegetables, cooking increases digestibility. Starches and cellulose, in their natural raw condition are insoluble. Cooking effects a softening of the cellulose, lightening the work of the stomach, and all other stages in digestion. With the starch the change is different, insoluble in cold water; under the influence of hot water the insoluble starch cells swell and burst. This occuring, the starch is said to be gelantinized. The temperatures at which this gelatinization occurs differs with different vegetables. With dry heat the effect is still different. By it, insoluble starch is changed to soluble dextrin. Dry heat changes the insoluble starch to the soluble. We are familiar with this change in the crust of bread and in toast, where the insoluble starch has been changed to the soluble dextrin. It is a stage in external digestion, and internal digestion is saved this step when it is accomplished outside the body.

The government has a valuable bulletin on the losses in boiling vegetables. Potatoes, carrots and cabbage were chosen as

subjects for the experiments, being considered good representatives of tubers, roots and pot herbs.

Many experiments were made in cooking potatoes. The results are summarized as follows:

- "(1) In order to obtain the highest food value, potatoes should the peeled before cooking.
- (2) When the potatoes are peeled before cooking, the least loss is sustained by putting them directly into hot water and boiling as rapidly as possible; even then, the loss is very considerable. But the loss of proteid is much less than when the potatoes are soaked in cold water first. The loss of mineral matter is about the same. The effect of the boiling water is to seal the surface of the potato by coagulating the albumen. The juices then do not escape, though a large amount of the salts (being directly under the skin and so near the surface) are dissolved before the sealing is effected.
- (3) If potatoes are peeled and soaked in cold water before boiling the loss of nutrients is very great, being one-fourth of all albuminoid matter. In a bushel of potatoes the loss would be equivalent to a pound of sirloin steak."

Similar experiments were tried with carrots, experiments as to the method of cooking to be followed in retaining the largest amount of nutrients.

The conclusions are as follows:

"(1) The pieces should be rather large than small.

- "(2) Boiling should be rapid in order to give less time for the solvent action for water to act upon the food ingredients.
 - '(3) As little water as possible should be used, and
- "(4) If the matter extracted be used as food along with the carrots instead of thrown away, the loss of 20 to 30 per cent of the food value may be prevented."

In experiment with cabbage, the conclusions were as follows: "In 100 lbs. cabbage uncooked are seven and one-half lbs. solid matter. On cooking about three lbs. of these seven and one half are lost. This loss seems unavoidable unless water in which it is boiled is used also, as in cabbage cooked with corn beef."

In general, vegetables should not be cooked in hard water, as the lime or magnesia of the water forms an insoluble compound with the legumen of the vegetable.

As has been shown, the object in cooking starch is to change it from an insoluble to soluble substance. Uncooked starches are unused by the system and a burden in digestion of other foods. It is natural the breakfast foods of every description should have sprung up. It is the protest of the people against half cooked cereals. The majority of these foods are pre-digested or partially so, having in their manufacture been subjected to heat sufficient to convert the starch into dextrin.

As an economical diet vegetarianism has much in its favor. However energy and power to resist disease must be considered also, and according to the majority of investigators a certain amount of animal food is essential. On the whole the ideal is found in the mixed diet.

THE RURAL HOME.

W. A. BURNAP, CLEAR LAKE.

From my point of view, the only home, in the fullest sense of the word, is the rural home. The city may furnish hotels and boarding houses and places to eat meals and sleep nights galore, but to my mind the word "Home" is associated only with green fields and bright flowers and whispering trees and singing birds; it ever and always recalls "the orchard, the meadow, the deep tangled wildwood." And no aggregation of brick, stone and cement, no matter how beautifully cut or how artistically piled, can, without rural environments, displace or replace my love therefor.

Notwithstanding the great advantages the Maker and Giver of all things has donated the country dweller for home building, how frequently have we seen His gifts woefully disregarded or wantonly abused. How often do we see the country dwelling, built upon all the classic lines of a dry goods box, hideuosly painted, set close to the dusty highway, flanked on one side by a pig pen, on the other a horse stable, while the barn yards and cow sheds bring up a close rear. The whole collection being so altogether revolting as to make at least two of our five senses recoil in disgust. These thing ought not so to be.

Most of the requisites of the rural home are bounteous gifts from the source of All Things and if we fail to enjoy the advantages He showers upon us, it is because we are too brute-like or too slothful to appreciate His blessings. Among the many bounties the rural home-maker may have for the taking, I will name a few:

Fresh Air. So scatter, clean up and ventilate the pens and stables; even the hogs and cattle will appreciate the change and thrive enough better to pay a hundred per cent profit on cost of the work, and the wife and children then will dare open all the doors and windows and enjoy the sunlight and air uncontaminated as God made it.

Plenty of Room. In this land of magnificent distances and broad drives, any person can afford at least a half acre lawn, especially as, if necessary, you can still utilize the grass thereon growing. So set the house well back from the road and when building hunt some good plans therefor, and one dollar will buy twenty-five good ones, and follow the suggestions there found. It costs no more to cut and put up lumber in pleasing and artistic proportions than to build the hideous monstrosities we often see. When the house is built, paint a pleasing combination of colors thereon. Any paint dealer will give you a large assortment of these combinations and any one you may select therefrom will produce harmonious results and cost no more than the glaringly bad contrasts often found.

The rural home should have a lawn. This may be made with a disk and harrow, blue-grass and clover seed. It should have trees. These usually can be most advantageously bought of your local nurseryman, but if money is short or you are on bad terms with the gentleman last mentioned, take your team and go to the woods for them. In the woods you will find elm, hackberry. ash, maple, basswood and cherry; all trees that, carefully transplanted and cared for, will thrive and do well. If you plant poplar, box elders and seeding cottonwoods, put them at least ten miles from the house. For vines, Wild Grapes, Bitter Sweet and Virginia Creeper can be had in abundance, which carried to your home and properly trained will make bowers of beauty that will be a joy always. Don't make the mistake of planting too many trees. Leave your house so the sun will strike and thoroughly dry it daily. Leave some part of your lawn open for grass alone and the trees you set plant them so they will look as much like nature and as little like art as possible.

Fruit must be in the rural home and plenty of it. The time has passed when an intelligent man dare say, "We can't raise fruit in Iowa." We can raise it freely and no rural home maker does justice to himself or his family who fails in this respect. Every rural home, worthy of the name, should have at least fifty apple trees, divided into something like the following varieties: 2 Tetofsky, 2 Whitney, 6 Duchess, 6 Iowa Beauty, 10 Wealthy, 4 Patten's Greening, 10 Malinda and 10 Northwestern Greening. It should have ten plums, say, 2 Rockford, 2 De Soto. 2 Wyant, 2 Stoddard and 2 Hawkeye. Also twelve grapes, all Wordens; simply that and nothing more in the grape line. It should have 150 raspberries, say 50 Older, 50 Nemaha and 50 Loudons, and last but not least, a strawberry bed started with Senator Dunlap, 50 plants, and Warfield, 100 plants. Peaches, pears and cherries I would leave entirely alone for gentlemen of leisure with long purses to spend their money upon.

The list of fruit here stated need take but little money to start and if planted in long rows running north and south, so arranged that its main cultivation may be by horse power, would require but little work, when measured up by the great benefit it would be to every member of the family from "Dad" down to the youngest "kid." Such a rural home as I have tried to depict need not cost fifty dollars more than the atrocity I mentioned in the early part of this paper, while its benefits would be many and lasting. It would add at least one thousand dollars in nurse and doctor bills; it would make you contented, your wife happy, your children love and stand by their home, and your children's children in future years give praise to you who planted trees for their comfort and profit.

Think about this, act upon it, and may you receive great

benefit and profit thereby.

EVERGREENS AND THEIR USES ON THE FARM.

I. W. HOFFMAN, CARROLL.

It is well said, that "The groves were God's first temples." Surely it is an inspiration to the soul and to man's better nature to dwell and be among trees and watch their habits and growth. It is pleasant on a hot summer day to ramble in the shade of an evergreen grove when the air is filled with the resinous odors emanating from the different kinds of evergreens. And this rambling adds a further delight, if these same trees have been planted and cared for and nurtured by one's own hand.

How desolate and uninviting a farm house appears, which is called a home, with no trees whatever to protect it from the cold blasts of the north during the long winter time, and whose inmates cannot stroll in the cool and refreshing shade when "Old Sol" sends down his almost vertical rays upon their heads on a hot summer day. Evergreens have always taken my fancy since my boyhood days. I have them growing around my home, and to be among them, watch and care for them, used to be my delight. I have fully realized my expectations. I have an evergreen windbreak to the west and north of my premises, and scattering trees to the south and east. These trees are White and Scotch Pine, Norway Spruce, White and Blue Spruce and Red Cedar.

The uses of evergreens on the farm are principally of two kinds, for shelter and for ornament. For shelter belts the White Pine, Scotch Pine, White Spruce and Red Cedar are among the best. The White Spruce being preferred to the Norway Spruce, for it is better adapted to the prairie and at the same time more ornamental, in the latter coming almost up to the Blue Spruce. It is a compact and upright grower and retains its limbs well to the ground. The White Pine is a grand tree for a shelter belt or wind break. It is to be preferred to the Scotch Pine, which

gets open and scraggy with age, but the White Pine grows denser and more beautiful the older it gets. The Red Cedar is a good tree, although it suffered some during the past winters. I have a row to the north which is twenty-five rods long and the trees are set four feet apart in the row. They are now about fifteen feet high and are a perfect wall of green. I have not lost any in this row. They were all from the Platte Valley, Nebraska. The eastern cedars all died for me.

For ornament the Blue Spruce stands at the head of the list. In fact, I find all of the Rocky mountain spruces to be excellent. The Concolor Fir, also from the Rocky mountains, needs special mention. It is a beautiful tree, but not extensively grown. It resembles closely the Balsam Fir, only the bark is of a whitish hue and the needles broader and longer. It is entitled to a place in every collection. The Douglas and Menzies Spruce are fine growers with a fresh green color, and make a fine showing on a lawn.

THE IOWA FORESTRY COMMISSION.

In September last, Governor A. B. Cummins appointed a commission, with six members, to constitute "The Iowa Commission of Forestry." The members of the commission are: Thomas H. Macbride, Iowa City; L. H. Pammel, Ames; Eugene Secor, Forest City; William Louden, Fairfield; I. M. Earle, Des Moines, and Wesley Greene, Davenport.

The members of this commission met in Des Moines and elected T. H. Macbride president, and W. Greene secretary.

Hugh P. Baker of Pennsylvania was present at the first meeting as a representative of the Bureau of Forestry at Washington. He presented a brief outline of the work that has been done by the Bureau, and of the effort that is being made in other states to conserve the timber resources of the country.

The work of the Iowa commission will be along similar lines,

which may be stated briefly as follows:

First. A general survey of the state to determine the present condition of its forests and streams, and of the material available for future use.

Second. The planting of plots to demonstrate the value of systematic work in forestry.

Third. The developing of forests by trained foresters.

Fourth. The creation of a non-partisan commission to control and direct the forestry work to be done by the state.

The immediate work of the commission will be a campaign of education in forestry; for who plants a tree plants a hope that will blossom and ripen into fruits of character inspirted by Him who made the groves His temple.



GRIMES' GOLDEN.

The Grimes' Golden is an excellent apple both for desert and culinary uses, and should find a place in the home orchard. It is a matter of regret that it is not a good commercial apple. It is a tender fruit that bruises badly in careless handling and its light color does not conceal these injuries from the buyer.

Its high quality commends it to all lovers of good fruit. To the careful grower whose skillful management of this delicious, yellow apple will insure its delivery to the consumer in unblemished purity it will prove a profitable variety to grow for market.

The Editor's Page.

Horticultural meetings soon to be held in this state: Northeastern Society at Osage, Nov. 17-19; Southeastern Society at Washington, Nov. 18-20; Northwestern Society at Sac City, Dec. 1-2; State Society at Des Moines, Dec. 8-10; Southwestern Society at Council Bluffs, Dec. 15-17; National Horticultural Congress at Council Bluffs, Dec. 14-19.

* * *

Man is a prolific creature; outnumbering all other animals in the world; can adapt himself to the widest range of territory and greatest divergency of climatic conditions; can exist in the frigid and tropic zones, but attains the highest development only in that zone where the extremes meet and overlap each other, to obtain sustenance in one taxes his energies too severely, while the abundance of food offered him in the other does not require sufficient effort on his part to bring out the latent forces within him.

It is not our intention to write a homily on wickedness as a divine instrumentality in developing the goodness in the human race, or the necessity of a conflict in the survival of the fittest, but to emphasize the fact that whatever is worthy of acquisition requires an effort to secure it. Perhaps it would be better understood to put it this way: Nothing of value can be secured without giving value in return. It is the old story of work! work! work! Not simply work, but work for a purpose, with some definite object in view, and then we must hew to the line if we would have no misfits in our building. There is an immense amount of work done that fails to accomplish that for which it was intended. It is possible that many efforts will meet with a similar result in the future.

When the frost has done its work, all tender, subtropical plants are killed in a night, and it is well that it is so. A lingering, half-dead existence is not a source of pleasure, and our flower gardens are planted for enjoyment. There is no need for sad regrets. A land of perpetual bloom is a figment from a poet's dream. A continuous feast begets satiety and that is not the parent of enjoyment. It is the blighting breath of winter that gives the charm of freshness and beauty to the flowers of spring.

Thanksgiving: We do not own a turkey, nor does cranberry sauce grow on our fen, so we cannot have the conventional Thanksgiving dinner, but we can still be thankful for the rain,

even if it does make the ground muddy and men feel disagreeable, for it carries food to the plants and quenches the thirst of animals; it fills the soil with water, the ponds for ducks, the rivers for the fishes and the seas to float the ship of commerce.

We are thankful for the sunshine that warms the earth, that

makes the birds sing, the lambs play and the bees hum.

We are thankful that we live in a land where the government is built on the cornerstone of human equality before the law; every corridor of achievement in its superstructure is open to all who care to enter, and on its pillars are inscribed this motto: "Do and the reward is yours."

We are thankful that when misfortunes do come they afford opportunities for deeds of heroism, for thousands can testify of heroes whose names have never been written on the scroll of fame, who have lived lives of self-sacrificing devotion to others that their burdens might be lighter, their suffering alleviated,

and their joys increased.

We are thankful that conquest does not sit on the lap of luxury or enterprise sleep on the breast of indolence; that the fires of wrath are extinguished by waves of kindness, and the groans of grief will break into ripples of laughter; that tears of sorrow are dried in the sunshine of joy and clouds of despondency are riven by gleams of hope; that the hard words of anger can be softened by love, and the bitterness of hate can be sweetened by affection.

We are thankful that great men have lived; that divines have preached and bards have sung; that orators have spoken and musicians have played; that sculptors have held the chisel and

painters have touched the brush.

Yea, we are exceedingly thankful for every instrumentality that has helped to make men happier and better than they ever were before.

The smoke of autumnal bonfires has been in my nostrils for weeks. It is the incense burned in the processional march of the seasons. How busy the village resident has been of late getting

his front yard cleaned for the winter.

It has been said by one of old, that cleanliness is next to godliness. We believe the writer intended to convey a greater truth than the casual reader may at first notice; but it is evident that the more a community believes in the one virtue the more they are inclined to practice the other. Boards of health insist on the observance of certain sanitary measures which they deem necessary to maintain good health in all densely populated cities or towns to prevent the spread of any infectious or contagious disease. As warm weather approaches the streets are cleaned, the alleys purified and all places suspected of containing the

germs of disease are disinfected, and every precaution taken to prevent the spread of any disease dangerous to the public health.

This precautionary work, thought to be so necessary to preserve the health of the human family, is not without its lesson to the fruit grower. Orchards are communities of trees growing more or less under artificial conditions and subject to diseases that would not prove so disastrous to them were they not growing in such close proximity to each other. Germs of fungus live through the winter in the decaying tissues of the dead leaves, while insects hibernate in the waste refuse scattered about the orchard. It behooves every fruit grower who would enjoy the best results from the orchard to enforce some simple sanitary rules that would greatly aid him in warding off the attacks of these enemies of his trees.

Diseases start and spread from small spores that live through the winter and the best way to control them is to prevent as many as possible from germinating. Preventive treatment is, usually, more successful than curative remedies applied after the disease is well under way, for the reason that when treatment is delayed until the disease is well established the injury to the fruit is beyond repair and the disease out of reach of the remedy you can apply.

The burning of all dead branches, leaves and rubbish every year will help keep both insects and fungus from getting a start in the orchard. The burning must be administered with the

same care that any other caustic remedy is applied.

Those who desire a fine show of hyacinths in their windows next spring should lose no time in securing the bulbs now. (They should have been planted in October.) Use five inch pots filled with good garden soil; add sand if it is inclined toward clay; press the soil well down on the bulb so that they will not lift up out of the pot when the roots begin to grow. When the top of the bulb is even with the surface of the soil it about the right depth; water them thoroughly, and when the surplus water has drained from them set in a cool place and cover with soil, coal ashes or sawdust to keep them cool, dark and moist. Sawdust is clean and we use that for covering a few pots kept in the root cellar, but it would not do in bulk where it would heat.

A good selection of varieties for the window are: For shades of red: Boquet Tendre, Amy, Grootvorst, Norma.

For white: Boquet Royal, La Tour d'Auvergne, Baroness von Thuyll, Grand Vainquerur.

For blue: Blockberg, Charles Dickens, Laurens Koster, Mignon de Dryfhaut.

These bulbs will cost about fifteen cents each, and will make a grand show if proper care is given them. Do not be in a hurry to bring them into a warm room. The pots should be well filled with roots before you place them in the window.

* * *

Specialize in your work. Be proficient at least in one thing. Where there is close competition you must be at the front if you wish to succeed. So make a hobby of something. Study it in every phase until you know all there is to be known about it, be it fruit or vegetable.

But someone will be ready to quote this trite saying: "Don't put all your eggs in one basket," which is very good advice as far as it goes, but if you complete the sentence it will apply to the specialist—"until you learn how to carry the basket."

It is just as important to know how to get the basketful of

eggs to market as it is to induce the hens to lay the eggs.

To raise a little of everything is perhaps best for one just beginning, he will not meet with complete failure, but his margin of profit will be small. If he raises the average standard crops of his locality he must do so on the least margin of profit. If he can produce an article of superior quality, his profits will be much larger. The safe way for him to proceed is to drop the least remunerative crop as fast as he can make his leading specialty more profitable than anything else he can grow.

NEWER LATE KEEPING VARIETIES OF APPLES FOR IOWA.

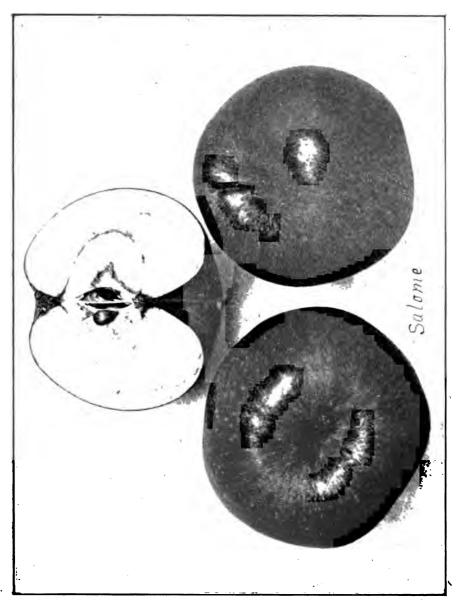
E. E. LITTLE, AMES.

In this paper there will be mentioned a few varieties of apples worthy of testing in a small way in the Home Orchard and show promise of being valuable for commercial planting in the more severe sections of the state. Some of them have been grown in the state for several years.

THE SALOME. It is quite an upright tree, although not as erect as Yellow Transparent; symmetrical, twigs are thick and strong; only a moderate grower. Foliage is dense, healthful, free from scab and blight, and resists drought and heat. It is

moderately productive and very hardy.

The fruit is medium to large, quite uniform in shape, form roundish ovate. Stem long, cavity is deep and broad, basin medium, quite narrow. Color is pale yellow, ground mottled and striped with pinkish red and shaded with red and a grayish scarf skin at base toward the cavity. Whitish or grayish dots are very conspicuous.



A WINTER VARIETY OF GOOD COLOR AND QUALITY.

The flesh is yellowish white, firm, crisp, tender, juicy, fine grained, slightly sub-acid, good. It is a good keeper and has

proven to be a winter variety for home or market.

SEEVERS. Tree moderately vigorous, upright, spreading, quite open, free from small limbs; twigs are slender, slightly drooping; foliage is moderately abundant with medium dark green; stands drought and heat very well; leaves of medium size; productive and hardy. Should be more widely planted in northern lowa.

The fruit medium or slightly above in size, roundish ovate in form; color is yellow ground with a tinge of green blushed with bronze or light red; dots are conspicuous russet with reddish circle about them. Cavity at stem end is deep and broad with considerable russet; stem is medium, rather thick; basin or calyx end of the apple is shallow; core is small to medium and closed. Flesh is white, firm, moderately fine grained, crisp, tender, juicy, slightly sub-acid; quality is good to very good; season

January to April.

INGRAM. Sometimes called Ingraham, but not correctly. It is a seedling of the Ralls Genet. The writer visited an orchard of this variety near Springfield, Missouri, during the picking season—the trees looked vigorous and seemed very thrifty and had borne good crops. It seems to be gaining in flavor in the Ozark regions and has been planted in this state. The fruit colors up better than the Ralls, its parent, but is reported to have the same fault that it runs small on old trees, but is an excellent keeper, which is much in its favor for planting in this state, providing it is hardy and has the other essential features after being thoroughly tested. The trees while young are said to be good and strong.

The color of the fruit is greenish to pale yellow, washed, striped with two shades of red; when exposed to sun the fruit is of a darker red hue, medium to rather small; flesh white, somewhat tinged with yellow; fruit juicy, tender, mild sub-acid; quality good to very good. Season January to May. A very late

keeper in the Ozark region.

OKOBOJI. Good keeper, medium size or above, oblate, greenish surface, striped and mottled with light red; of good quality. This variety originated in northern Iowa and is now being propagated. Its place of origin would suggest a good degree of hardiness and as that is the essential thing to be considered in the growing of apples in the northern section of this state it could be planted in a home orchard that was much exposed where other varieties were tender.

WINDSOR (WINDSOR CHIEF). This is a Wisconsin seedling and is probably hardy, as it originated in a state where hardiness of tree is essential. For this reason after being more widely

tested in this state it may prove to be valuable in the colder parts. Although at present, from those who have fruited it, it can be recommended in any part of the state in a home orchard.

The fruit full medium or above in size, form roundish oblate, truncate, the color fairly attractive when fully colored. It has a yellow ground with dull to deep red, large russet dots over the surface. Flesh moderately fine grained, sometimes coarse; yellow tinged with green, juicy, slightly sub-acid, sometimes nearly sweet, with slight aroma; very good quality.

COLLINS (COLLINS' RED). Sometimes known as the Champion or Collins Red, is a variety which originated in the Ozark region of northwestern Arkansas. It is of good size, attains a bright red color which is attractive, but does not rate high in quality as Roman Stem, probably as good as Ralls Genet.

Fruit large or slightly below, roundish oblate, slightly unequal; good. Stem moderately stout; cavity medium to broad, moderately deep; calyx medium, partly open, sometimes closed. Skin thick and tough. Color when exposed to sun is bright dark red, occasionally striped with a deeper shade with bits of yellow or ground color appearing. When not highly colored specimens are less red and show some yellow. Flesh white or nearly so, firm, rather coarse, moderately tender, juicy, slightly sub-acid, fair to good; season January to April.

HARDY HERBACEOUS PLANTS.

(Continued from October Number, Page 316.)

NARCISSUS.

Narcissus have been under cultivation for many years and there is a great number of garden varieties. Corbularia, Ajax and Queltina are the hardy groups. The Hermione, or Polyanthus group is tender in this locality. Plant catalogues give long lists of named sorts of Daffodils, with single or double flowers. These bulbs thrive best in a rather heavy soil, with partial shade. The flowers sometimes fail to open well during a hot dry season.

NELUMBIUM.

The Nelumbiums are tall growing aquatic plants of easy culture; they do not need more than a foot of water over the roots. They are hardy where the soil does not freeze. They can be kept through the winter in boxes of damp soil, without water, in a frost proof cellar. Muskrats are very fond of the tubers of the Lotus.

N. luteum is a native; has large yellow, fragrant flower.

N. speciosum is the Egyptian Lotus. It has large pink flowers that have a delightful fragrance; its sweetness suggests candy. There are a number of garden forms of this species.

NEPETA.

Nepeta cataria, Catnip, is a common introduced weed along roadsides and in fence corners. Cats are specially fond of this herb.

It is one of the family herbs found in many gardens.

N. glechoma, Ground Ivy, is another introduced weed that grows in shady places. It will cover soil where grass will not grow under trees or shrubbery.

There is a variegated garden form of this variety; both sorts

are used in filling vases.

NUPHAR.

Nuphar advena, Spatter-dock, is common in ponds, where the water is shallow, of times growing in mud only.

It has some value in the water garden, though it is almost too aggressive in small ponds.

Nymphæa.

Water Lilies are queens in the aquatic garden.

There are two native species in the state, and a number of tender exotic sorts that can be grown if the roots are stored in a frost proof cellar during winter. Aquatic gardening has received considerable attention the last twenty-five years in this country and the number of garden forms of water lilies is now so great that few amateurs would care to grow all the sorts offered in trade lists.

N. odorata, Sweet-Scented White Water Lily, is the most common native sort.

N. tuberosa, Tuberous White Water Lily, grows in deeper water than Odorata and is a stronger, larger plant, but not so fragrant.

N. alba candidissima is an excellent white variety from Europe.

N. marliacea chromatella is the best yellow garden sort.

N. laydekeri purpurata is another garden hybrid with crimson and rose colored flowers.

N. zauzibarensis is a tender, free blooming variety that varies

in color from pink to purple in its many garden forms.

N. devoniensis is the best night blooming tender lily. It was probably the first hybrids from rubra. The tender sorts should not be planted until the water is warm—about the last of May.

ENOTHERA.

Œnotheras are plants of easy culture; they prefer sandy soil, with full exposure to the sun, but are not particular as to location or soil, as many of them are inclined to be aggressive weeds.

Œ. biennis is the common Primrose of the garden, though in

some places has taken possession of waste places.

- E. cæspitosa is tender, but blooms from seed the first year, as many of the other primroses do, so may be treated as an annual.
- Œ. missouriensis has low prostrate stems with large yellow flowers.

ONOCLEA.

The Onocleas grow in wet shady places.

O. sensibilis, Sensitive Fern, is a native found in moist ground and is a good fern to plant in a shady place near water.

O. strutiopteris, The Ostrich Fern, is more common than sensibilis and is adapted to the same uses.

ORNITHOGALIUM.

Spring blooming bulbs from the Mediterranean region.

O. umbellatum, Star of Bethlehem, is a small greenish white flower, on a stalk 4 to 6 inches high.

This seems to be the hardiest one of the group.

OSMUNDA.

Royal Ferns are usually found in damp soil.

O. regalis, Royal Fern, grows from 3 to 5 feet in height, should be planted in a wet place.

O. cinnamomea, Cinnamon Fern, an elegant plant for a

marshy place. Not quite so strong a plant as the regalis.

O. claytoniana, Clayton's Fern, grows on drier soil and is less robust.

PÆONIA.

Pæonia officinalis, the Common Peony, is one of the best garden perennials. A large bed of these plants in bloom makes a gorgeous display in the garden. The flowers are also useful in vases for room or hall decoration. There are a number of garden forms from this variety and hybrids of albiflora.

P. tenuifolia has divided foliage and dark red flowers.

P. moutan, the Tree Peony, is fairly hardy with protection, but the flower buds are sometimes injured by heavy frosts and fail to bloom satisfactorily.

PAPAVER.

Those who are familiar with the annual poppies know how

brilliant they are when in bloom. The oriental species are more rugged in plant with equally showy flowers. There are a number of garden hybrids of this species, of which bracteatum is the most commonly planted in this state.

P. nudicaule, the Iceland Poppy, is tender and suffers from extreme heat of summer and cold of winter. Though a perennial, it usually dies out in a short time. It is better to treat it as an annual, for seeds sown early in the spring will bloom the first season.

PENTSTEMAN. Beard-Tongue.

There are six native species of Pentstemans. The garden varieties are not all hardy enough to go through the winter without protection.

 \hat{P} . barbatus torreyi has bright scarlet flowers; reported tender, but can be grown by giving it some protection. Barbatus is most commonly found in gardens. Digitalis and Grandiflorus are native.

PHLOX.

Both the annual and perennial Phloxes are popular garden plants.

P. divaricata is the wild Sweet-Williams of the woods.

P. subulata is the Ground, or Moss Pink so useful in planting dry banks, where it blooms profusely in spring.

PHYSOSTEGIA.

The Physostegia is a native plant that does well in the garden. A white sort is now receiving some attention.

P. virginica has light pink flowers. July and August.

PLATYCODON.

Platycodons are hardy, but should be planted in well drained soil.

P. grandiflorum grows about two feet in height, has blue cupshaped flowers; some are almost white.

P. mariesi is more dwarf in growth and has larger flowers.

POLEMONIUM.

Polemoniums are pretty plants of easy culture.

P. reptans is a native with blue flowers. May and June.

PONTEDERA.

Pontedera cordata, Pickerel-Weed, has shiny leaves and dark blue flowers. It is a good plant for the aquatic garden.

(To be continued.)



THE WILLOW.

Willows are useful trees, the wood is not as valuable as Ash, Oak or Walnut, but is quicker in growth and the trees can be planted in soils that are not adapted to those varieties.

They grow readily from cutting, and when the trees are large enough to use for posts or poles may be cut off and the roots will soon grow other trees to take their places. The wood is not durable in contact with soil, but will last from three to ten years when used as posts.

Willows are best adapted to wet soils, and are useful to plant along streams to prevent the soil from being washed away during floods.

CHEMISTRY IN SOME OF ITS RELATIONS TO HORTICULTURE.

J. B. WEEMS.

Nature gives to us many of her blessings with an exceedingly generous hand, bestowing them with such liberality that she asks us to simply reap the harvest, but it is not so with her mysteries held within her stronghold or the secrets of her laws and methods by which she controls the elements and changes the sunshine into blessings for us. To gain the knowledge necessary to understand even to a limited extent the laws of nature, toil for years and centuries is required. Our experiences and the results of our efforts to wrest these secrets from nature have been handed down from one generation to another. Grouping the facts together we have named them the sciences and subdivided them into many fields, each with its name.

We are gaining from Mother Nature many things of great value to the world as the result of the effort to understand her laws. The pioneer scientific investigator, reaching into the dense forest of the unknown, brings his constributions to the masses. Contribution after contribution is collected by those who spend their lives at the task. Some genius groups these contributions together and adjusts them to the condition so that the result is a blessing to the masses, and a great discovery is made. In the rejoicing and honor bestowed upon the transmitter of the original constributions the pioneers in the field are seldom mentioned for their part in the work, but the credit is given too many times to one alone. One of these sciences which deals with nature's screts in the most complex form, and lends its aid to many other branches of human knowledge, is that of chemistry.

The science to many is a difficult one, and this fact is too often taken as an excuse for a lack of knowledge of the subject. In spite of its difficulties there is no other science which can be made so useful to agriculture and horticulture as chemistry. For it must be realized that nature does not yield her secrets for feeble effort. Difficulty and discouragement are the first barriers met with in any field which tests the capacity of man. Every one must make use of this difficult branch of knowledge in

their daily lives, little realizing that they do so.

A bright ray of sunshine grasped by the leaf of a tree spends its energy in converting the carbon dioxide of the air onto starch and sugar; these mixed with a small contribution from the roots, are transformed into the fruit. Flavored with Mother Nature's best essences and colored by her artists the fruit is presented as one of her blessings to mankind in health and disease. So the horticulturist is a manufacturer, and in his products he can bless the community in which he lives. At the same time nature whispers that it takes brains and education to make use of her blessings. The horticulturist must realize that he is not only a producer, but that he must educate the public also to appreciate his product. The man who swallows a glucose jelly sold at the corner grocery in buckets at five pounds for twenty-five cents and fifteen pounds for fifty cents, and does not know the difference between this substance and a product of natural fruit is a fit subject for education in taste.

The part of the food product which we designate as its taste or the palatableness is as essentially a part of the substance as the energy which it furnishes. We say that a product is composed of carbon, hydrogen and oxygen, but it must be realized at the same time that these substances serve as energy carriers only, and that a mixture of charcoal and water is not a food until it has been elaborated in nature's laboratory. The flavor of an apple or any other fruit is a part of it as well as its value as a food material. If the palatableness of the food substances is not considered and we depend upon the calorimetric determination only, then the body is only a mechanical device for the production of energy. If, from the idea of economy, the adulterated product is preferred to the natural one, then some genius should discover a process by which crude products as coal dust or saw dust can be condensed and converted into products suitable for the digestive system.

The value of fruit as food may be seen from the following analyses: (After Bauer.)

FRUIT	Water	Protein.	Free Acids	Sugar	Other Nitrogen- ous Matters	Fiber	Ash
Apple	83.58	0.39	0.84	7.73	5.17	1.98	0.31
Pear	83.03	0.36	0.20	8.26	3.54	4.30	0.31
Peach	80.03	0.65	0.92	4.48	7.17	6.06	9.69
Grape	78.18	0.59	0.79	14.36	1.96	3.60	0.53
Strawberry	87.66	1.07	0.93	6.28	0.48	2.32	0.81
Currants	84.77	0.51	2.15	6.38	0.90	4.57	0.72
Orange (pulp only)	89.01	0.73	2.44	4.95	0.95	1.79	0.49

The common dried fruits may be said to have the following composition:

FRUIT	Water	Protein	Fat	Free Acids	Sugar	Other Non-Ni- trogenous Matter	Fiber	Ash
Apple	27.95	1.28	0.82	3.60	42.83	17.00	4.95	1.57
Cherry	49.88	2.07	0.30	'	21,22	14.29	0.61	1.63
Raisin	32.02	2.42	0.49		54.26	7.48	1.72	1.21
Fig	31.20	4.01	1.44	1.21	49.79	4.51	4.98	2.86

It is well known that the soil contains a certain amount of plant food. To produce certain crops large quantites of plant food are required, while with others less is required. The production of the sugar beet causes little loss to the soil if the residue is returned to the soil, directly or indirectly, as sugar is composed of carbon, hydrogen and oxygen. These elements being present in the atmosphere and in the water, naturally there is no drain upon the soil. The same conditions exist for butter and cheese, so that only a small loss of this nature is necessary.

If some of the grain crops and the production of cattle, hogs and sheep be compared with the loss due to various fruits it is naturally of interest in connection with the question of soil fertility.

	POUNDS OF PLANT FOODS IN 100 LBS. SUBSTANCE			t food s sub- ts		POUNI FOOD BU	food sub-		
PRODUCT	Nitrogen	Phosphoric Acid	Potash	Value of plant in 100 pounds stance in cent	PRODUCT	Nitrogen	Phosphoric Acid	Potash	Value of plant f in 100 pounds s stance in cents
Corn	1.82	.70	.40	26.6	Currants .		.11	.27	1.8
Oats	2.06	.82	.62	31.1	Grapes	.16	.09	.27	3.6
Wheat	2.36	.70	.30	33.1	Pears	.09	.03	.08	1.6
Cattle	2.31	1.65	.18	35.6	Plums	.08	.02	.24	3.4
Sheep	1.96	1.13	.16	28.8	Raspb's	.15	.48	.35	5.4
Hogs	1.76	.69	.15	24.6	Strawb's	.15	.11	.30	3.7
Who. Milk	.53	.19	.17	8.0	Cabbages	.38	.11	.43	7.1
Skim Milk	.56	.20	.18	8.4	Cauliflo'r	.13	.16	.36	4.0
Cream	.40	.15	.13	5.0	Cucumb's	.16	.12	.24	3.7
But'rmilk	.48	.17	.16	7.2	Lettuce	.23	.07	.37	4.9
Whey	.15	.14	.18	3.2	Onions	.14	.04	.10	2.3
Butter	.12	.04	.04	1.8	Sw Corn .	.21	.05	.22	3.7
Cheese	3.93	.60	.12	50.2	Tomatoes	.16	.05	.27	3.5
Apples	.13	.01	.19	2.5	Potatoes	.21	.07	.29	4.3
Blackb's.	.15	.09	.20	3.2	Turnips	.18	.10	.39	4.5
Cherries	.08	.06	.20	3.4					

In the section of our country where the soil still retains its natural fertility and where the statement is often made, "Commercial fertilizer shall never have to be used to replace that lost by plant growth," consideration of the question of plant food is too often disregarded. It must be realized, however, that the plant food in the soil is to the farmer and horticulturist simply a supply of substance, like, for example, a bank account. A constant demand, however small, ultimately exhausts the supply of the plant food of the soil and it must be replaced. It is much the safer method to use the soil in an intelligent manner and pay as little as possible for tuition in Mother Nature's school of experience.

The horticulturist should naturally be interested in the sciences connected with his field of labor, and not only interested in these sciences, but make use of them as much as possible. While chemistry is only one of the number of sciences which may serve for the advancement of future work in the horticultural field it is readily seen that the successful horticulturist of the future will be the one who applies in an intelligent manner the sciences connected with his chosen field of labor.

MARKETING FRUIT AND VEGETABLES.

W. T. RICHEY, ALBIA.

After having grown a large fruit or vegetable crop, the question often arises, what shall I do with it? And the subject of marketing the same is one of very great importance. We will try to discuss the same for a short time. If the fruit man or gardener lives near a good local market, and desires the best returns for time and labor expended, I would suggest selling direct to the consumer. In which case the fruits should be carefully picked, sorted, and placed in nice, clean boxes or crates, yegetables tied in nice uniform bunches, all inferior specimens rejected and fed to the stock, and only first class goods put on the market. These should be presented to the customer in nice, clean baskets or boxes. All packages, whether fruits or vegetables, should be stenciled, with name of farm or grower, then with the salesman properly attired, and with a good delivery wagon and team, you can approach your customer with something that is not only attractive, but is appetizing as well, and something they will appreciate, and you will be surprised at the way your goods disappear, and the way your customers flock around to get some of the nice fruit and vegetables.

But some one may ask, how should the salesman be attired, and what are some of the qualifications required of the salesman? In the first place his attire should be such that he would not have cause to blush if invited into the home of any of his customers, or approached by any lady of the land, or he should be

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so attired that he would not be ashamed to attend a church service, or public gathering if opportunity offered. Thus keeping himself clean and presentable.

In the second place he should have good judgment and good common sense. With the above qualifications he will usually

meet with success.

If the fruit man or gardener does not have a good local market, and does not possess the above qualifications, then we would recommend that he secure the help of some good reliable merchant or commission man to handle his goods for him.

But in the foregoing article we have spoken only of the better class of fruits and vegetables, and the question naturally arises, would it not be better to put the inferior goods on the market at a reduced price than feed it to stock. We would in-

variably answer: no.

But after cutting out the defects in your fruits the better part might be worked up into butters and jams and then during the winter days you will find employment, and enjoyment, selling your homemade jams, jellies, etc., that will surpass anything you find on the market, and instead of asking yourself the question, what can I do with my fruit and vegetables, it will be, how can I supply my customers with these products.

WHICH?

It requires considerable fortitude to wage a successful warfare against the enemies of our useful plants. Rusts, blight and mildew thrive best when conditions are least favorable to combat them. Frequent rains wash off insecticides and fungicides when we apply them; weeds grow with astonishing rapidity just when the ground is in the poorest condition to use a cultivator or hoe to destroy them. It is the ability to cope with the situation at such times that determines the success or failure of the crop. We may be in a mood to say "cuss words" about weeds and vermin, but the truth is were conditions not favorable for these pests they would not be for the plants we are anxious to have do well.

To avoid disaster at such times you must work with the head as well as with the hands. None of these enemies can be entirely subdued, but they can all be held in check if you have the courage to put up the right kind of a fight against them. Codling Moth, Curculio, Apple Scab and rot are the worst foes of the orchard, and they can all be controlled by spraying and by sanitary treat-

ment.



WHITE BIRCH.

The White Birch is a northern tree. There are two species that are planted under this name, one native of the Eastern and the other of the Western Hemisphere. The European species is the large tree and the one usually planted. The cut-leaved Weeping Birch is a charming tree for the lawn; the pendulous branches and white bark makes the tree a conspicuous object even in a winter landscape.

The White Birch holds its foliage until quite late in the season. Borers are the worst enemy of these trees and many fine specimens have been killed by them.

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Reports are issued monthly on the condition of the fruit crop from April to August. Bulletins of the Society are sent free to members.

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DECEMBER

1908

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OF

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IOWA HORTICULTURE

VOL. 1

DECEMBER, 1908

NO. 12

TREES AS A FACTOR IN THE RURAL POP-ULATION PROBLEM.

J. W. JARNAGIN, CEDAR FALLS.

(Read before the Iowa Park and Forestry Association.)

The theme selected suggests considerable sentiment, and sentiment is an element that is not to be despised. It fills an important place in the solution of great problems and is a potent factor in the life and character of a great people. It brings to us the altruistic spirit and enables us to soar beyond the mere sordid things of life and dwell in an atmosphere devoid of monetary considerations and commercial perplexities. In these days of practical business ventures, financial investments and speculative tendencies it is well that we occasionally get outside of these material calculations and deal with those finer sensibilities that are the sheet anchor of our hope, the guiding star of our aspirations and the consummation of our desires. Sentiment builds up character, appeals to unselfish natures and opens the doors to wholesome thought and optimistic meditation, therefore you will excuse me if in the discussion of the theme I deal largely with the things that might be rather than with those that really exist.

We hear much in these days of the problem confronting rural life. President Roosevelt has taken the initiative and has appointed a commission for the purpose of investigating conditions in the hope that suggestions may be offered that will serve to benefit rural communities, stimulate rural pride and foster a patriotic spirit that shall be the means of making farm life more attractive and home surroundings more congenial and pleasant. The appointment of this committee and the attitude assumed by the president have attracted nation wide attention and many there be who are not only capable of giving advice, but are very willing to do so. "Josh Billings" once observed that there is advice enough laying around loose to make several worlds like this, and not questioning the truthfulness of the suggestion I crave your indulgence while I contribute my part toward the vindication of his statement.

Trees are to a prairie country what mountains are to the en-

vironment of a great plain. We read of the sturdy mountaineers and while we abhor their ignorance and superstition we cannot but admire their rugged character and heroic deportment. a prairie country like this if we are to produce the best brain and brawn we must provide for a diversity of landscape. Trees are the settings in the picture painted by nature's great artist. There is something about them that is inspiring and ennobling. Poets have sung of the old oaken bucket and of the old mill by the rippling stream in order to bring to us the memory of those early days upon the farm, but in a sweeter strain they have brought to us the sacred memories that cluster about the great elms, maples and the richly endowed orchard that furnished the fruit that became an indispensible part of the winter's store of plenty and good cheer. Trees have a home-like greeting whether in winter when they ward off the sharp blasts of the north wind, or in summer when the hot rays of the sun are modified because of the green foliage that flutters unceasingly in the gentle zephyrs. I asked a little four-year-old boy the other day, upon his return from spending eight months upon a claim in the western part of South Dakota, how he would like to live out there. "I would not like it 'cause there are no trees," was his quick response. If a lack of trees was so suggestive to this little boy, what must their presence be to the children brought up on the farms of Iowa? We are confronted with a great problem these days, and that is the keeping of the boys and girls upon the farm. There seems to be an attractiveness about the towns and cities that is causing the young people to leave the rural homes and seek either employment or dishonor in the thickly populated centers. In some cases this probably could not be prevented, but in many cases a proper conception of home life and congenial, attractive surroundings would have supplanted dissatisfaction and prompted the boy or girl to have been content on the farm. The well kept lawns, the handsome drives and the beautiful parks in the cities have an attraction that appeals to those who are accustomed to live close to nature, because here they see the common plants, trees and shrubs artistically arranged and properly cultivated, and when they return to their country home they look with disgust upon the tangled mass of briars, shrubs and trees and wonder why it is not possible to have at least some of the attractiveness of the city or town lawns developed on the farm. But they need not have all of the beauties of the city parks on the farm, because these require time and expense more than could be profitably expended in the country. but no farmer is too busy or too poor not to have pleasant, attractive conditions about his home. A variety of trees planted with some care as to arrangement, a collection of shrubbery and some choice evergreens, with vines and flowers, can be provided

at every farm house, and no farm is so small that it is necessary to have the hogs, calves, chickens and geese in full possession of the front yard. We have in mind a modest farm house where was reared a family of nine children. All but two of the children are married and live upon farms near the old homestead. The father and mother with the two younger children occupy the old home and there is good cheer and plenty in store at all times. Great trees nod and bend in the summer storm or in the winter blizzard and shrubbery and vine add to the attractiveness of the The old orchard affords an abundance of fruit, and luxury is apparent on every hand. The rural telephone enters the house and the mail carrier on his daily rounds brings to the farm the daily paper and the letters from friends far away. Conditions are ideal. We asked the old gentleman the other day if he expected to move to Cedar Falls to spend his declining years, and he very quickly replied that while he liked to go to town occasionally and expected to do so, yet he had no thought of leaving the old home, and then he proceeded to recite the attractions about the old place, and the first thing he mentioned was the trees and the orchard. "Do you see that big maple over there? Well, the only time my wife and I ever had any serious disagreement was over that tree. She said it was shading some of her choice rose bushes so that they would no longer blossom, and she insisted that I should cut it down. would rather have parted with the best horse on the farm than to have done that. I tried to reason with her, but woman-like, she was sot in her ways and it looked like the old maple would have to come down. I was just at my wits' end when my oldest son and his wife came over from his farm in his automobile. took him to one side and told him of our trouble, and while I was doing that mother had his wife in the kitchen filling her up about the rose bushes. Well, John had an idea. He said: 'Father, let's get mother over to my house tomorrow and while she is visiting we will just dig up the rose bushes and transplant them; they need it anyhow—and we will put them where they can get all the sunlight they need, and the old maple will still stand.' We did this and you ought to have seen how happy mother was when she saw what we had done. Strange that neither of us had thought about that plan of adjusting our difficulties." We have heard this father tell many times that the trees and other home comforts—the nicely kept lawn, the big orchard and the well kept surroundings—had so influenced his children all these years that not one of the nine had any desire to live in town.

The government is making a great effort in forestry these days. The commercial side is all that is given. No thought is taken of the æsthetical phase of the question. Hon. Enos A.

Mills, United States Forest Agent, in a recent address said:

"We are nearing a timber famine and at the present rate at which we are now using our forests will last about fourteen years. This means a severe handicap in the development of the country, for in the development of a country wood is largely used. timber famine means the end of the lumbering industry, which now plays a large part in the development of the country. means an increase in the price of tools, and especially those used by the farmers, and that means farmers will be compelled to ask higher prices for food, so that a timber famine means an increase in the cost of living. I want to make this prediction, that no financial panic which this country has ever had will be as serious as a timber famine, for without timber industries will be impoverished. The American people last year used more wood

per capita than ever before.

"Every nation that has endured has had to forest its lands and the words 'without forests' is written over every dead and decaying nation since history began. I believe that elementary forestry should be made a part of the course in every high school and that there should be a chair of forestry in at least one state college in every state in the Union. The national government now has 168,000,000 acres of forest lands. None of the forest fires have occurred in national forests, because these are guarded by forest rangers. All in all, the forest is the most influential of natural agencies and they should be perpetuated. Japan, Switzerland and Germany have learned this. There is no one subject which will add to one's interest in life as to be acquainted with elementary forestry. One more thing, forests shelter scores of all kinds of useful birds. Most birds live on weed seeds and noxious bugs, and if you double the bird population of the country you will increase the productivity of every farm in the country."

In thus discussing the utilitarian side of the question, Mr. Mills also gives a strong reason why the presence of trees are conducive to farm comforts, and whatever will add to the comforts and attractiveness of rural home life will certainly be a potent factor in inspiring the boys and girls in rural communities to remain on the farm. We are not pleading for the backwoodsman who became a character in American literature, not because he communed with trees, but because he failed to drink in the sunlight or neglected to look up through the branches and behold the stars in the heavens above him, but we are pleading for the intelligent, sturdy, patriotic, progressive husbandry in whose keeping rests the future of rural American life. Tree planting in Iowa ought to have a fresh baptism of enthusiasm. It takes but a few years to get shade and ornamental trees of sufficient size to make them a thing of beauty and a joy forever.

Their influence over the home life of the boys and girls will be of inestimable value. A lack of trees has made many a country school house the most dreary, desolate looking place in the entire community. So badly neglected are the school premises that children despise the opportunities set before them and early resolve to cast their lot with those who are more fortunately The great cities with their sin and iniquity, their amusements and their fascinations, their greed and their opportunities are beckoning for the boys and girls from the farms of Iowa. There ought to be a general awakening to this fact. A condition and not a theory confronts us. The hope of free government is in the quiet, peaceful homes scattered over these fertile prairies, rather than in the congested centers of population, honey-combed with anarchy and crime. The goodly heritage handed down to us by the fathers is worth protecting. One element that will assist very materially in this great work is the making of the rural homes pleasant and attractive. Every township should have its public park or at least a grove where public gatherings, neighborhood picnics and the like could be held. Rural life ought to have its pastimes and its diversions. Provide for the amusement, the entertainment and the education of the children in the rural communities in order that they will not be forced to go to town for these things and the rural population problem will be solved.

A FORESTRY COMMISSION FOR IOWA.

THOMAS H. MAC BRIDE, IOWA CITY.

(Read before the State Horticultural Society.)

The Iowa Forestry Commission is no doubt an outcome of the recent Roosevelt Washington convocation for the conservation of our natural resources. The forms of natural wealth considered at Washington were those of the soil, of the mine, of the forest, and the stream. Our honored governor, bringing with him some of the enthusiasm of that meeting and in fulfillment of the pledge made by those in attendance there, had no sooner returned home than he began to reflect what might be done in Iowa. He doubtless had heard of the "Park and Forestry Association," knew of our organization and work; and so, turning away from the soil, the mine, and the stream, he fixed upon the forest as the great natural resource first to be emphasized in the attention of the commonwealth of Iowa, and accordingly forthwith appointed a Forestry Commission.

No one who knows the relations of things in our economic use of this world will fail to commend the governor's wisdom.

Take the forests from the earth and it speedily becomes untenable by civilized, not to say enlightened, men. Take the forests from the earth and streams and soils vanish, and even the treasures of the mine become largely inaccessible; so that if we consider in a broad way the natural resources listed as affecting nation-wide, race-wide concerns, the forest is pre-eminent among them all.

But how about a prairie such as Iowa? Why a forestry commission for a prairie state, a commonwealth of farms, no mines of iron or gold, no forest wealth, no counties of pine or oak; why a forest commission for such a state? Why not instead a corn commission, or a park commission, or something more in harmony with the industries of the people? The answers to these questions are manifold. They affect at least three great factors in the well-being of our citizens: the use of wood, the protection of ourselves and our dependent animals, and our universal water supply. Let us briefly consider these things in Towe

The use of wood is to most people a thing as natural as the use of bread, and although almost equally vital, receives ordinarily no attention whatever. We always have bread; we always have wood. We go to the grocer for flour, he always has it; we go to the lumber-yard for timber, and have not yet begun to reflect that he has it not. We have not yet realized that whereas the supply of flour is a matter of human industry, nay more, of human foresight, learned by the experience of untold generations through all the millennia of human history, the supply of trees and their products in America is a gift of fortune, a treasure trove; no more the result of our industry or forethought than is the oxygen of the air. The trees in the tremendous economy of nature were here, we found them here; we had naught whatever to do with their coming, but we have destroyed them. That is not all. The forests of the country constituted one of the factors in that arrangement of the natural world to which men by all their past history are adjusted and adapted, and we have destroyed that; that is we have destroyed or are destroying one of the agencies in this world which has made it suitable to our use, and so made us what we are. The problem, you begin to see, runs deep; it affects the people of prairie Iowa just as much as those of forested Wisconsin or Missouri. It is not the mere use of wood, but the use of the forest that we must contemplate. even as Iowans.

But let us look at the mere wood problem of Iowa a little more closely. When the pioneer came to these prairies, wood, except the native supply, was inaccessible, unattainable. As a result our fathers treasured the native oaks and walnuts. Look at the map of your county. The prairie is divided into liberal

fields, 160 acres in a farm, at least, but our native timber land was divided into lots, small lots, no more than ten or twenty acres in each, that every settler on the prairie might have wherewith to build his home and keep his children warm. My father at first had eighty acres of prairie and twenty of timber, which latter was more than his share, in view of the holdings of some of the neighbors. Timber-land was at a premium. At one time fifty or sixty years ago, wooded lands in Cedar county, rough and rocky though they were, were worth \$100 per acre, when the finest prairie could be had almost for the asking. This was the first status in Iowa; then came the exploitation of Minnesota pines. Our native trees became, except for fuel, suddenly value-We built our houses and shelter buildings, and our extravagant, useless board fences, all of clear white pine. Pine such as the market now, in Iowa City at least, does not at all afford, went into pig-pens and cow-yards. Now the Minnesota and Wisconsin forests have been almost completely denuded; the lumber we use in construction, when we get it at the yards, comes from Georgia, from Idaho, from Oregon, and California; our shingles and siding must be hauled across the whole continent, and the supply limited and expensive at that. We have already turned again to our native supply. The oaks that the pioneer treasured and our fathers spared have gone with a rush. Even the despised cottonwoods, planted by the winners of the prairie, have yielded up dimension stuff for barns and buildings of greater size. I suppose there is hardly a train-load of merchantable trees in Iowa today, and such as yet stand, on the holding of some old-time farmer, will probably go this winter to meet the increasing demand for building material to shelter the sons of men.

Nor is this all. By all reports of experts, even the forests of the western mountains are near the end. Fifteen or twenty years will see the absolute exhaustion of all our native woodland; I say absolute, because lumbermen nowadays do not limit themselves in logging, to trees mature; they clean the ground, cutting the trees six inches and upwards, and then burn the remainder. They do not simply cut the forest; they extirpate it, destroy it, as far as possible, forever.

Now what shall be done in the presence of a situation such as here described? Two things: First, repeal the tariff of lumber, which enables those who have exploited the national forests to go further and plunder the people to the accumulation of enormous wealth, all of it taken from the public, from the men of the present generation and their children. Repeal the tariff on lumber, and thus relieve in so far the pressure upon the meagre native supply yet standing. This is our first duty.

Second, prepare for the demand for wood, for lumber, as we

prepare for the calls for flour; raise the appropriate crop, meet the demand in advance.

The first remedy rests with congress, and the action taken ten days ago by our Iowa legislature makes sure that Iowa at least will be heard from along these lines. The second remedy rests with the people, and it rests with the forestry commission, called by whatever name, in every state, to enter upon an economic propaganda to show the people their true situation and to teach them their opportunity and duty.

If what is reported by experts is true, and we have no reason to doubt it, in twenty years every native tree suitable for lumber will have come to value, and dearth will be upon us. There needs a national repentance, a wholesale turning from economic folly, and a nation-wide effort in the next few years toward tree planting and forest conservation.

It will be said that this duty rests with other states rather than with Iowa; Iowa can better raise corn than lumber. Doubt-



The forest has been cut from the hillside.

less this is largely true. Nevertheless there are in Iowa thousands of acres that were better in trees than in any other crop, steep slopes by water courses, eroded hills, ledges and cliffs, all untillable and at present useless as they lie. Every acre of such land in Iowa should go to forest. We often hear it said that Iowa has no waste land. Not if we were wise enough to use every acre, but everyone who knows Iowa knows that in this state last year thousands of acres grew up to weeds and weeds only. We have such lands in Johnson county, they may be seen in Lyon county and in every county lying fair between.

It is said, and rightly, that individual owners may not rear a tree crop; the harvest is too long deferred. Only the state has sufficient length of years to undertake arboriculture. This is largely true, and it is the business of a forestry commission to guide the state in just this duty. Doubtless even in Iowa the



Stream once covered on both sides; still protected on the south by native woods.

state may at length secure at nominal cost considerable holdings, such lands as have just been mentioned, which may be used as well for experiment and instruction as for direct service. Within twenty-five or thirty years, as matters stand now, any forest managed by the state will begin to yield returns and more than pay expenses. The emperor of Germany does by no means neglect, in making up his annual budget, the millions from his forests.

Besides, such is the nature of our climate that every tiller of the soil must have a grove, some planted trees, and our people should be encouraged to plant groves in such a way as to bring the highest returns, returns in useful timber and lumber as well as in shade and protection.

All this is trite; you have heard it all before. But all have not heard it, and none have much heeded it. The time has come when all must hear and the nation must heed!



The uncovered stream-bed.

We have never yet tried arboriculture; its possibilities are almost absolutely unknown. With our present progress and knowledge in plant-breeding, who shall predict the outcome of a little attention to the culture of trees? Why may we not hope to see as a result of scientific effort and selection results, in the

improvement of native lumber-making plants, as great as those which distinguish our cultures in grains and fruits? In fact, Mr. Burbank has already shown the possibilities in this direction by doubling the lumber building power of a walnut tree! What a prospect this opens up to a forestry commission, even in Iowa.

But this is only one side of our subject. Those of us who can remember primitive Iowa, recall her abundant streams, clear-flowing, equable, healthful, stocked with fish; pike and bass and channel-cat, abundant. We need but look over the bridge parapet today to see the changed conditions. Muddy floods pour down at times bearing as a burden the best elements of our farm soils; the old time channels have been long since choked with bars and mud-flats, around which in summer sweeps a meagre stream poisoned with sewage and from which all self-respecting game-fish have long since fied. The waterpower that served the pioneer at a thousand precious mill-seats, has been forgotten; the dams have long ago been swept away by April freshets; only the weed-choked race or the forever silent burrs, dust-covered by

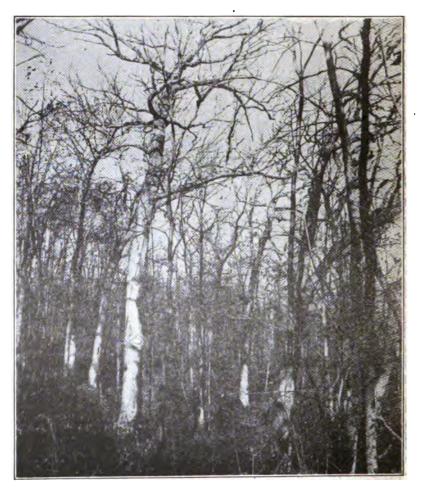


The Iowa river still covered on its eastern bank. The preservation of a fringe of trees on the west would not much affect tillable land and would save the stream.

the roadside, remind the traveler of the lost arts and industries of our fathers. Iowa has possibly no abandoned farms, but of abandoned villages and hamlets there are plenty.

The restoration of the forest will restore the streams; the return of the waters will bring back their constant energy; the possibilities of power will revive the village, and industry will redeem our now wasted river valleys. Why should not every possible water-power furnish electricity?

This is no fancy sketch; the day of such redemption is at



Primeval forest in Iowa. The old oaks, once the entire forest, still stand now surrounded by young trees.

hand. The same co-operative effort which is ditching the sloughs and draining the marshes will be turned to the improvement and restoration of our water courses; forests shall again clothe their banks, shade their sources, and prevent the wasting of their currents by the intensity of summer's heat; sewage will be consumed upon the soil, and the waters unpolluted shall bear blessings only, give home to the finest varieties of fish, and potable water everywhere to man and beast.

The fact is, as stated at the outset, the cultivation of trees in appropriate situations touches beneficently every industry. The forest affords shelter to the habitant, protection to the waters and springs, permanence to the soil, relief to the unceasing waste of coal, lumber for almost every constructive enter-

prise or manufacture. Even paper is made of wood.

Arboriculture is a phase of agriculture. Iowans are learning to raise corn, some of them have come to skill in producing fruits. The Iowa Forestry Commission, or, more broadly, the Iowa commission for the conservation of our natural resources, will teach the teachable people in the world how to rear and use trees as the profoundest sort of world-economy, the highest sort of earth-culture, the triumph of enlightenment in this earthly home which God has given to the sons of men.

OUR TREES, PARKS AND FORESTS.

JANE PARROTT, WATERLOO.

(Read before the Iowa Park and Forestry Association.)

At one time a large per cent of the surface of our country was covered with forests, which were perhaps the richest and finest on earth, but the onward march of civilization has carried with it devastation of our natural resources. In no other country in the world is there such lawlessness in this respect as in our own.

For several hundred years our ancestors have been cutting down trees and destroying the new growth until more than one-half has been consumed. It is only in recent years that the American people have awakened to the actual condition of affairs and the spread of popular knowledge concerning our native trees and plants, during the last decade, has been marvelous. The planting and preserving of trees and forests is now considered a higher form of civilization.

Club women are co-operating with forestry committee and the Forest Service at Washington, and are doing much to forward the cause of forestry and the acquirement of parks large and small. Many clubs are accomplishing practical work in tree planting, tree preservation, reforesting waste places and the extermination of tree pests. March 10 has been set aside as Rally Day by the General Federation and Forestry Day is coming to be a recognized program.

Arbor and Bird Day is well established in schools and is a strong factor in awakening public interest. The necessity for

serious work is fast becoming apparent.

Chief Forester Gifford Pinchot says: "Except China, all civilized nations care for the forests. Until recently the United States ranked nearly with China in this respect; and our country still remains far behind the progressive modern nations in nearly all that relates to the protection, preservation and conservative use of forests."

Only one-fifth of our forest area is in national and state forests, the remaining four-fifths is in the hands of private owners, which means that sooner or later the trees will be cut down and a timber famine is inevitable. The cliffs and valleys of the western coast range of mountains extending from San Francisco bay up towards Oregon were once overgrown with big redwoods. These trees love the hillside sea slopes and mountain valleys. Wherever they chose to grow, other trees yield and disappear because of their size. The underbrush of the redwood is of gigantic proportions and rises normally in circles. They are propagated by suckers rather than their seed cones and an old tree falling after eight or ten centuries of life leaves its children growing around it, veritable families of the forest.

One of the most public spirited gifts ever made to the United States came from William Kent of Chicago, who deeded to the government 295 acres of primeval redwood forests on the southern slopes of Mt. Tamalpais, about six miles from San Francisco.

In 1905, thirty women, members of the Out Door Art League, were able to arouse the whole country to a sense of the great mistake it would be not to preserve the California Calaveras giants for all time. This Art League worked in unison with other organizations for the passage of a bill through congress for the purchase by the government of the Calveras groves and over a million and a half names were presented in favor of the bill.

The news of a great discovery made recently by some lumbermen in California, who were searching for new worlds to conquer, has just been made public, regarding a grove of 15,000 Sequoia found in the unexplored county of Fresno. This grove is said to contain at least five times the number of giant trees possessed by the famous Mariposa grove. The trees so newly discovered are reported as being more symmetrical and more perfect in form than the trees in any other forest and have scarcely been touched by fire or the woodman's axe. Unlike the trees in other groves, they stand closely together, none ever having been cut. These great sentinels of the mountains have prob-

ably been standing from 8,000 to 9,000 years, defying time itself. Officials of the Southern Pacific road have already taken steps to have the grove set apart as a national park. The president of the United States is said to be heartily in sympathy with the movement and it is to be hoped that these giant trees will not be subjected to the greed of modern commerce and that congress will take the entire grove under the protection of the government. It seems almost incredible that a forest containing trees from 200 to 300 feet in height could have remained hidden so many years in a civilized country.

The destruction of the California redwoods has been very rapid and it is now only a question of a few years when the original growth will have nearly disappeared. It seems like an act of vandalism to cut down these giants to be used for tooth-picks

and cigar boxes as has been done in the past.

Our telephone and telegraph poles are also one of the great drains upon our forests. It takes 200 years for a tree to reach serviceable size and the price has risen 150 per cent in the last ten or twelve years.

The park which is the most permanent arrangement in all the world for the study of trees and plants is situated in Boston. This is perhaps the finest botanical garden in the world and has provided for a continuance for the longest time. The park commissioners of Boston leased to Harvard University for the term of one thousand years these plats of land delineated and marked as driveways and park-ways, paying during the year the rental of one dollar. The University supplies its prestige, scientific faculties and teaching strength. The city of Boston makes and maintains the driveways and holds the property forever free from taxes.

The landscape art of the Arboratum gives the park a great value. Everywhere in the park the group arrangement is maintained, the pines are together, the oaks and so on as far as possible, and the casual visitor has the impression that he has stumbled upon an unusually fine bit of nature's planting. The Arnold Arboratum, which is to last a thousand years, contains as far as practical all trees, shrubs and herbaceous plants, either indigenous or exotic, which can be raised in open air and each specimen is distinctly labeled.

Aside from their commercial consideration, trees have a value far beyond estimation. They are not only beautiful, but have life given forces which make them essential to the welfare of man. Trees are more effective in purifying the air than vegetation in any other form. It has long been known when trees intervene between marshes and the habitation of man, that there is little danger of malaria. In England the army officers are required by their regulations to make their encampment with

groves protecting them from the air of the marsh. Trees and shrubs absorb poisonous gases and at the same time give off oxygen, without which man cannot live. All low, swampy lands should be thickly planted with trees, shrubs and vines to take up the moisture and obliterate all danger of malaria. In this way land is made and floods prevented. That we are pursuing the opposite course is quite apparent. The timber lands along the denuded banks of small streams and rivers bear mute evidence of the destruction and waste going on about us. The muddy soil is unfit for agriculture and unless the underbrush is preserved or trees replanted, the low swampy lands will soon become breeding spots for mosquitoes and malaria.

An equalization of temperature is another consideration. The temperature of leaves and wood of a healthy tree is at all seasons of the year about 45 degrees. In the winter when the cold is excessive a thickly wooded district will be warmer than the prairie, and in the summer when the heat is oppressive the vapor given off by the trees has a cooling effect and the canopy of

leaves absorb the hot rays of the sun.

Our trees need to be guarded not only from the woodman's axe and forest fires, but from the inroads of insects. Concerning this destructive element. John Davy, of Kent, Ohio, whose lectures on trees and their diseases has attracted national attention, says that thousands of trees are being killed by insects, and he claims that in fifteen years Ohio and the adjoining states will be treeless if the fall web-worm cannot be brought under subjection. Already they are throughout the woodlands and it is beyond human power to control them longer. Any tree, he says, defoliated five years in succession will perish, and thousands of walnut and hickory trees are standing dead, killed by the caterpillar. The gypsy brown tail moths are sweeping westerly from Massachusetts, attacking the apple, elm, wild cherry, walnut, hickory, and indeed anything and everything in the form of a tree. As a check on the inroads of insects, he advocates the co-operation of forestry and civic leagues with the Audubon Association in the inauguration of a great national campaign for the restoration of our native American birds.

As you all know, these tiny creatures keep up a constant warfare on all insect life, guarding our trees by day and night, seeking their prey on leaves, twigs and trunk, under the fallen leaves and in the loose soil, tapping here and there for food in the form of insects, larva and eggs.

Birds are indeed the friends of the trees as well as man and without them such a plague will sweep the land that the very air we breathe will be teeming with insect life.

Nature after all is a wise provider and her natural balance should be preserved. Destroy the birds and a plague of insects

will sweep the land, destroy the trees, and the beautiful garden in which we live will become a barren waste.

It is easy to tear down and destroy nature's handiwork, but difficult to restore. Our trees, birds and forests should be guarded with jealous care so that we may leave them as perma-

nent possessions for the generations to come.

We should realize that we are the care-takers of this beautiful garden spread out before us and that the slaughter of a tiny bird or the lordly survivor of the forest should be considered as little less than a crime. That trees, birds and plant life are the natural heritage of man and that our rights have been invaded when the natural balance has been destroyed.

"Think of your woods and orchards without birds! Of empty nests that cling to boughs and beams As in an idiot's brain remembered words Hang empty 'mid the cobwebs of his dreams! Will bleat of flocks or bellowing of herds Make up for the lost music, when your teams Drag the stingy harvest, and no more The feathered gleaners follow to your door? What! would you rather see the incessant stir Of insects in the winrows of hay, And hear the locust and grasshopper Their melancholy hurdy-gurdies play? Is this more pleasant to you than the whir Of meadow-lark, and her sweet roundelay, Or twitter of little field-fares, as you take Your nooning in the shade of bush and brake?"

GRAFTING THE PLUM.

E. M. REEVES, WAVERLY.

(Read before the Northeastern Horticultural Society.)

In the beginning I wish to state that there are secrets connected with this branch of horticultural work that I will not at this time disclose for the reason that I do not know them, but will willingly tell all I know for the benefit of all who are interested.

In the propagation of the plum the foreign stocks were used entirely until recently. Budding, root-grafting and top-grafting were all on the tender, imported stocks and nurserymen thought it necessary to buy these stocks for their use. Later a few made use of the sprout from native trees and this led to the use of the seedling root for our native plum.

These have proven of more value in various ways than the

foreign stocks. They are hardier. They unite more readily with

the native varieties and so produce the best trees.

Good plums should be selected from which to save seed. The general practice is to separate out the seed from good ripe fruit and spread upon the ground in a shady place, mixing them with sand. Keep moist and cover with coarse litter until spring, when they should be planted as early as the ground can be worked, as they start growth as soon as thawed. Keep the seedlings growing vigorously, but do not crowd the growth, as they can be easily made to grow too large for use. Pack in the cellar in fall the same as apple stocks, being careful that they are not allowed to dry and moist enough to be wet.

Wait until near spring to graft and cut the scions as they are needed. Plum scions can be kept a long time if proper care is used, but they require more careful packing than apple scions and besides are hardy enough to stand the weather until wanted. Use the same method for plum grafting as is usual with the apple—namely, a short piece of root and a scion of twice the length put together with the tongue splice. Wind with waxed thread or paper. When finished the graft should be about seven inches in length.

Pack in moist packing material of any sort, being careful to keep the root more moist than the top as it requires a good degree of moisture, while the top is kept in better shape if rather dry.

Plant as soon as the ground is in good condition.

The plum may be top grafted and as many varieties grown on one tree as it has limbs. This is practical on small trees, but not usually a success with large trees. Top-grafting may be done any time during mild weather in March or through April.

Top-grafts are best protected by winding with waxed paper or very old cloth. In growing plum root grafts extreme care should be taken to pull out all roots on which the scion fails as

these are of little value for fruit.

Root grafted trees (on native roots) are of greatest value in this northwest country. They are the most reliable in orchard,

being long lived and fruitful.

The above are legitimate grafts and are heartily recommended if the best varieties are secured, but an illegitimate and harmful plum-graft consists in the working off of a variety as a high price novelty, because it is new, when it is less valuable than some old variety.

It should be the aim of growers to admit no plum or other fruit to the list that does not in some one or more particulars surpass old sorts. We now have varieties that will serve the purpose of this fruit until a decided advance is shown in some new variety.

The Editor's Page.

The most important horticultural event of the year in this state was the National Horticultural Congress at Council Bluffs. It was the best display of fruit ever made in the Mississippi valley outside the great national expositions of the country. The people of Council Bluffs deserve much credit for bringing this fruit show to a successful issue. The daily attendance was large, but more people should have seen this fine exhibit of fruit.

We have given much space in this number to forestry. We should have greater veneration for the trees; they were and are the guardians of the race. Were it not for the trees all animal life would soon perish. We have stood by the cradle of American colonization, at Santa Fe, at St. Augustine, at Jamestown, and at Plymouth, and the truth of this statement became more and more apparent. It was only under the protecting boughs in the heavily wooded districts that the colonists were able to maintain themselves in a new and undeveloped country. In the sparsely wooded districts, though more bland, life was too strenuous for the early colonists to make much progress. Unfortunately, they did not respect and care for their friends, but consigned them to death. Our forefathers grubbed out and burned the trees. We are not yet fully awakened to the enormity of this offence against nature's laws; but are slowly becoming conscious of it. The offense was probably committed through ignorance, but the public outcry would lay the blame on greed of gain.

There is another offense that is even worse than the slaughter of the trees, committed in the name of science; defiling the water in our rivers with sewage so that it is unfit for the use of man or beast. Oh, fie, on such sanitation! It is such an abhorrent method of disposing of city filth that it should not be tolerated in a civilized community. All water from sewers should be purified before it is permitted to enter or mix with water in a river or lake. Earth is the absorbent of dead matter, and to it should be committed the sewage of the towns, so that water in the rivers may flow as clear and sparkling as when it came gushing from the springs.

"Clasp angel of the backward look And folded wings of ashen gray, And voice of echoes far away,

The brazen covers of thy book; Even while I look, I can but heed The restless sand's incessant fall, Importuate hours that hours succeed, Each clamorous with its own sharp need. And duty keeping pace with all. Shut down and clasp the heavy lids; I hear again the voice that bids The dreamer leave his dreams midway For larger hopes and graver fears, Life greatens in these later years, The century's aloe flowers today!"

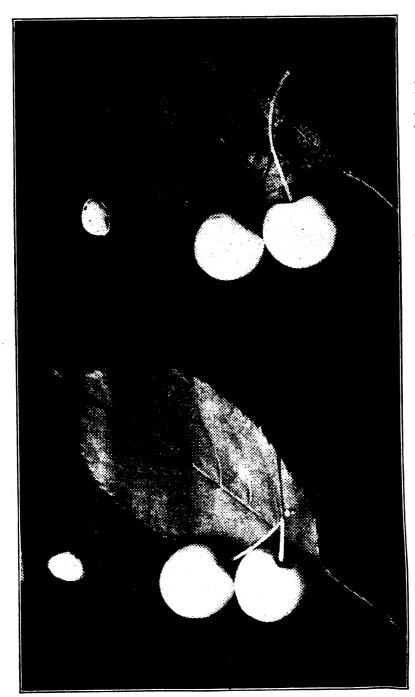
NOTES ON CHERRIES.

E. E. LITTLE, AMES.

Among the orchard fruits grown in this state the sour cherry is one of the most delicious. The varieties which compose most of the plantings of this fruit in various parts of the state since it was first introduced were brought in by the early settlers from their old homes in the East. The varieties have not changed much since the early plantings. In 1883 there was an importation of cherries made from Europe by the Horticultural Department of Iowa State College and in this collection was a yellow sweet cherry. It was propagated and distributed under the name of Yellow Glass and is now growing in many parts of the state. The nomenclature of this variety has been somewhat confused as grown by different persons throughout the state. It has been found growing under the names of "Double Yellow Glass" and "Saylor." Specimens of the fruit and twigs were received during the past fruiting season from a number of persons who have bearing trees of it and careful comparison was made as it was received from the different persons; also several trees were visited and carefully examined and they all seemed to be identical. The following is a full description of this variety:

YELLOW GLASS. Fruit is heart-shaped, sometimes rather broad, but quite regular; above medium to large in size, some specimens as large as a medium sized Royal Ann and some larger than Montmorency; a whitish yellow color with rather glossy medium thick skin; cavity deep, broad; stem long, rather slender; a distinct suture and rounded apex; flesh firm, rather juicy, meaty; flavor sweet; quality good when fully ripened; stone large, cling, plump, ovate to broad ovate; fruit ripened rather

unevenly the past season; season July 1 to 5, 1908.



Fruit, leaf and pit of Yellow Glass cherry. Natural size. Specimens are from different parts of the state,

Tree is medium to large, rather open, upright, slightly spreading with medium to rather stout branches of medium length; foliage is rather dense and healthy; leaf large, oblong ovate, gradually taper-pointed, of a soft texture with broadly crenate markings, with a long, rather stout petiole and large, prominent, usually two, kidney shaped glands near the base of the leaf.



A Yellow Glass Cherry Tree.

The tree is a moderate bearer and is moderately hardy, probably best suited for growing in the southern part of the state and in the home orchard.

In 1877 D. B. Wier of Lacon, Ill., became interested in the production of new varieties of cherries and by selecting seeds of our hardiest varieties he produced a number of seedlings which were thought to be of sufficient value to disseminate. Some varieties of his collection which were disseminated were the Periam (Wier No. 44), Northwest (Wier No. 29), Wier (Dan or

No. 11), and Wier No. 12.

Periam (Wier No. 44). Tree is medium or slightly above upright, spreading with moderately strong branches; foliage scattering; leaves small to medium, rather ovate. The fruit is of the Montmorency group, small to medium, of a light red color; flavor acid; quality moderately good. It does not seem to be an

improvement over the Early Richmond.

NORTHWEST (Wier No. 29). This belongs to the Morello group and the tree resembles the English Morello very much in size and habit of growth. Fruit is round, obscurely heart shaped, of medium size; color dark red to almost black at maturity, with firm flesh, which is deeply colored; flavor acid; quality fair to good. It is a good variety for market. In season a little earlier than Early Richmond.

WIER No. 12. This belongs to the Bruseler Braune group of cherries. Fruit long, roundish, cordate, of medium size; stem long, rather stout; color dark red; flesh firm and crisp; juice colored; quality fair; flavor sprightly sub-acid; season is middle

of July. It is the latest in season of the Wier seedlings.

WIER (Dan or No. 11). It is described by H. E. Rowley, Lacon, Ill., who was foreman under the late D. B. Wier, as follows: It is a very early cherry, ripening fully as early or a little earlier than Northwest and Early Richmond. It is a more upright grower, a very prolific bearer. Fruit is black or nearly black, a little oblong or heart-shaped; juice dark and flavor sweeter than many of the sour sorts. The trees at the Iowa Experiment Station are not of bearing age.

Our present list of varieties of sour cherries are sufficiently hardy and suitable for growing over a large portion of the state and bear fruit over a long season, beginning the middle of June and extending until the middle of July. But in order to make the cultivation of this fruit more certain in the northern part of the state and gradually extend it farther north into Minnesota and the Dakotas it will be necessary to improve the already known sorts by careful selection and breeding of the most de-

sirable hardy varieties.

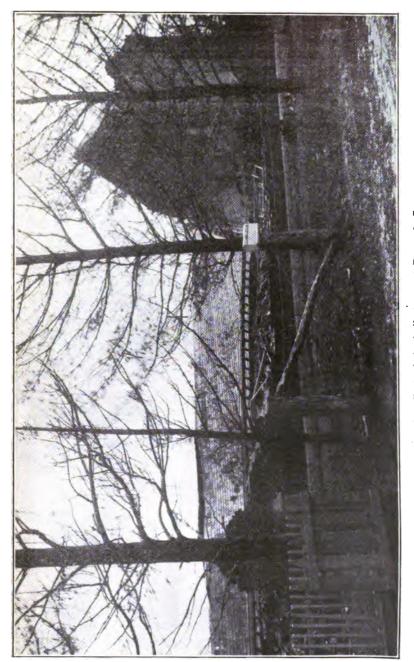
FUNGOUS DISEASES DURING THE SEASON OF 1908.

L. H. PAMMEL, AMES.

The writer is under great obligations to members of the Iowa State Horticultural Society who have from time to time sent reports on the fungus diseases of horticultural plants in the past. We have just completed a summary of the reports on fungous diseases for the season of 1908. Such reports have been made in previous years by myself, and earlier than this Dr. Byron D. Halsted, who was professor of botany here after Dr. Bessey left, also made some reports on the prevalence of fungous diseases. It is my intention to bring these reports together for a series of years, so that we may know something more definitely of the nature and spread of these fungous diseases. The report for 1908 is somewhat less favorable for fungus diseases than that of 1907, although in some places certain fungus diseases were quite troublesome, low lands suffering quite severely from the rust of oats, while spring wheat suffered much more severely than winter wheat. A most disastrous hail storm effected a few counties in northeastern Iowa, namely, Winneshiek, Allamakee and Clayton counties. This hail storm not only stripped the foliage off of all of the trees, but small grain and foliage were beaten to the ground. Where the foliage was removed from the trees they later again put forth new leaves, so that by the middle of July these trees had the appearance of leaves coming out in the spring. In many cases, too, large injuries were produced upon the branches, so much so that these trees will later suffer greatly from fungous diseases. It was also noticeable that where the small grain was injured by the hail it was much subject to rust.

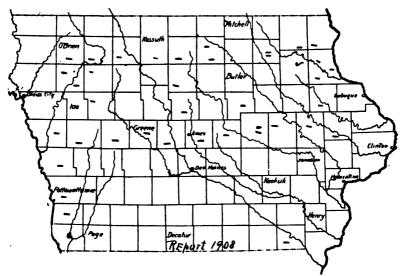
APPLE SCAB (Venturia inæqualis). This disease of apples has been abundant in many parts of the state, but more particularly on the fruit of such varieties as the Wealthy, Fameuse, Wild Crab, and the Siberian Crabs. The Duchess and other apples of this type have been comparatively free. The leaf form was more severe on the Siberian types than the Malus type. We noted it severe on the Transcendent, but less abundantly on the Wealthy and not at all on the Duchess. The disease was not as severe as in 1907. In some districts the Apple Scab was local, thus in Floyd county apples were not nearly as scabby as in Cerro Gordo county. Scab is reported as severe also in many parts of the Eighth district.

BLIGHT (Bacillus amylovorus). At the beginning of the season it looked as though blight would not injure the trees greatly. None was observed in central Iowa in May. The first evidence of the disease was the first week in June (June 8th) in Ames and in Des Moines on the Transcendent; later, however, it began

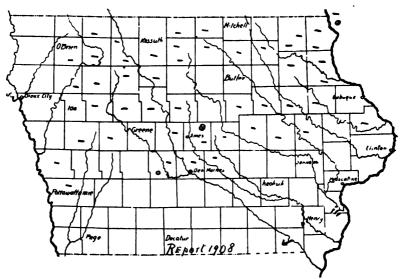


Trees showing the effect of the hail storm at Decorah, Iowa.

to appear on the Malus type like the Wealthy, Snow, etc. Reports show that there was less twig blight in this district the 7th



Apple Scab, (Veuturia inequalis), — not severe, √ abundant.



Apple Blight, (Bacillus amylovorus), — not severe, O absent, O very severe v abundant.

than in 1907. The disease was not as severe in other districts as in 1907. Reports of the destructive character of blight on pears came from Decatur county. As in former years it was quite

widely scattered in the state.

PLUM AND PEACH SCAB (Cladosporium carpophilum). The plum crop was extremely short so that there was not much fruit for the fungus to attack. It was reported from Dallas, Polk and Story counties. Not as aboundant as in 1907. Peach scab, especially on late peaches, was common, reports of the destructive character of the fungus coming from Warren, Iowa and Dallas counties.

Tomato Spot (Cercospora?). From Story and several other counties reports were received that a fungus was seriously threatening the tomato crop. This disease is an apparently new one. The leaves were spotted with yellow and dead circular or irregular areas. The disease appearing about the middle of July.

POTATO DISEASES. No reports have come to us of the occurrence of potato rot fungus (Phytopthora infestans), an occasional report of rotting potatoes, probably due to bacteria. The early blight (Macrosporium solani) was common in all parts of the state and the chief loss to the potato crop must be ascribed to this fungus. The potato yield in the state is only a little over 80 bushels per acre, which is small.

ANTHRACNOSE OF RASPBERRY (Glæosporium venetum). Anthracnose of the raspberry continues to be a very destructive disease and was reported from many sections of the state. More

severe on black cap than red.

STRAWBERRY BLIGHT (Sphærella fragariæ) was quite prevalent in many parts of the state, especially in the Ninth, Tenth,

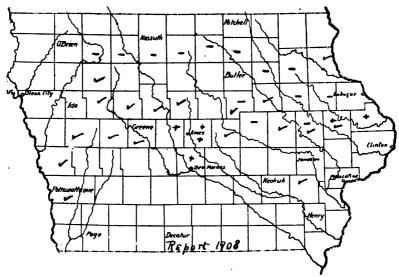
Eleventh and Seventh districts.

CHERRY LEAF SPOT (Cylindrosporium padi). This disease was not as abundant as in 1907. Reported as destructive to cherry in Iowa and a few other counties; in Story county it did not appear till about the first week in June, when it gave promise of becoming abundant, though the dry weather the latter part of July and August checked its development. This disease was reported as severe in the Sixth district upon the Montmorency and even the Early Richmond, which heretofore had been reported as the least subject to this disease in this district. In Linn county some report it as troublesome to cherries, nearly as severe as in 1907, although this was not general.

LEAF BLIGHT OF BEET (Cercospora beticola). There was not as much of the spot disease of the beet as in previous seasons; it

was, however, widely scattered.

Brown Rot (Scientinia fructigena) was reported from several counties, especially destructive to peaches. More or less of this fungus occurs every year, especially on plums. The plum



The Leaf Spot of Cherry, (Cylindrosporium Padi), + severe, — not severe, $\sqrt{\ }$ abundant.

crop was small. However, in some counties where the crop was good the disease seems to have been severe.

PLUM POCKET. Plum pocket and enlarged plum branches (Exoascus) were rather common owing to the cool conditions prevailing in April and May.

CABBAGE ROT. There was less cabbage rot than usual. The dryness of August made conditions less favorable for its development.

SMUTS. Smuts of all kinds were no more frequent than in

previous seasons.

DOWNY MILDEW OF GRAPE (*Plasmopora viticola*). This fungus occurred in many parts of the state. In August and September found on the Concord and Worden, but not as destructive as in 1907.

DOWNY MILDEW OF PEPPERGRASS (Pernospora parasitica). This fungus was fairly common in May on Lepidium apetalum and Capsella bursa-pastoris, but not as common as in 1907.

LETTUCE MILDEW (Pernospora gangliformis), which was abundant on Wild Lettuce in 1907, was rather rare in 1908.

MILDEW OF PLANTAIN (Pernospora alta) was very abundant in 1907. While found here and there in low grounds in 1908, was not nearly as common as the year previous.

We may conclude that as a whole the season of 1908 was not as favorable to the spread of these mildews as the season of 1907.

RUSTS. Rusts were common and abundant in some places.

This is particularly true of the rust on small grain. Winter wheat had much less rust as compared with 1907. *Puccinia graminis* and *P. rubigo-vera* were less abundant on this grain than on spring wheat.

Oats were comparatively free in some places, especially the early varieties and on high grounds. In low places the rust was rather bad. The northern sections of the state suffered more than the southern. The yield of oats was better than in 1907 and the weight was better. Two kinds of rust occurred on oats, the leaf rust (Puccinia coronata) and stem rust (P. graminis).

APPLE AND OTHER RUSTS. Apple rust was no more severe and perhaps less so than in 1907; common on Wealthy. Sunflower rust was abundant. Corn rust no more severe than in 1907.

POWDERY MILDEWS. Powdery mildews of all kinds were prevalent during August and September, especially on lilac, cherry, grape, various composites, Elder, knotweed (Polygonum aviculare) etc. The dry August favored the development of these fungi. Mildew of rose was common not only in August, but in July until frost. A mildew was common also on Virginia Creeper.

The method of gathering reports may be of interest to those who have not received our circular letters. Through the cooperation of the Bureau of Plant Industry of the United States. Department of Agriculture, circulars were sent out to different correspondents in the state. They were asked to report on the prevalence of diseases and send specimens. The reason that specimens are asked for is that we wish to determine accurately what the fungous disease is. At the close of the season the results of our personal observations and of the cards sent in by our correspondents are tabulated and reported. The accompanying maps will show where our reports have come from on these diseases. We note first the crop, then the disease, and give scientific name, the relative prevalence, percentage of injury, estimated loss, whether the crop is important or unimportant, the earliest report whether the weather conditions were favorable or unfavorable to the production of the disease, and notes on the resistant varieties.

Maps show the abundance of the apple scab, apple blight, the bacteria mildew of cherry and oats rust.

SOD AND SODDING.

B. SHIMEK, IOWA CITY.

(Read before the Society of Iowa Florists.)

There are few home owners who do not at some time encounter the need of producing or renewing sod. In our own state blue-grass is so universally used for this purpose that the whole question revolves itself into one of growing blue-grass successfully.

The very fact that the practice is so common may make it appear a waste of time to discuss it. Everyone knows that all that you need to do is to put a piece of sod or a bit of grass seed in contact with the fertile soil of our state, and of course the grass will grow!

Yet there are many who do not understand the proper treatment of grass (unfortunately for the object of this paper they do not often attend such meetings as this), and even those who have repeatedly tried the process may find something of interest in this brief paper. The discussion here presented is restricted to the consideration of sod for lawns and parking, though the fundamental principles involved are applicable to blue-grass pastures as well.

Blue-grass is usually grown for the purpose of developing a dense permanent sod. For this purpose it is essential that a vigorous root-system be developed which will not only sustain a rich carpet of green during the growing season, but which will maintain the life of the plants during the winter and the dry summer.

It is a fact well known to students of plants that as the surface features become harsher and the supply of food and water becomes less constant or less certain, the plants growing upon such surfaces produce relatively larger root systems and smaller tops, and are thus able to withstand dry conditions, during both winter and summer, which would prove fatal to plants with roots lying near the surface.

In view of this well-established principle it would appear to be advantageous to somewhat abuse blue-grass, a plant quite adaptable to a variety of conditions, in order that the root system may be enlarged, and the perpetuity of the sod be thus insured. Experience has shown that this is really true, for blue-grass forms a finer and more lasting sod upon poorer soils than upon the richest loam, and it is a significant fact that blue-grass and trees, the two greatest and most common beautifiers of our surroundings, may be grown upon soils which are inferior, or almost worthless, for other purposes. Yet most persons who sow blue-grass seed for sod consider it desirable to spread rich soil, or a large amount of fertilizer, upon the surface before sowing. Indeed the writer has known of cases in which property owners

removed the poorer surface soil and replaced it with rich soil at considerable expense, and to the detriment of their sod. This practice is apparently sustained by the fact that in rich soil bluegrass quickly sends up vigorous blades and culms, but the roots do not penetrate to greater depths, and the first snowless winter or dry summer will cause many of the plants to perish. The blue-grass will also be more easily crowded out by weeds. In several cases which have come to the writer's attention, one of them in his own experience, a part of the filling of a lot was made with rich soil, and a part with poorer subsoil, and in every instance the rich soil produced more vigorous looking grass at first, but an inferior sod in the end.

The principal subsoils of our state are loss, the yellow clay which covers most of the western, northern and eastern portions of the state; the drift, consisting of joint clays with more or less sand, pebbles and boulders, and appearing at the surface chiefly in the north central part of the state; and alluvium, a combination of the materials of the two preceding, with an admixture of organic matter, found along our streams and lake borders.

On the uplands loess or drift, which are chemically practically the same, everywhere form the subsoil, and when this comes to the surface it is regarded as a poor soil. Yet upon these very clays, particularly that known as loess, blue-grass

will form a sod unequalled elsewhere.

The writer has had excellent success in developing sod on loess clay in response to the following treatment: The surface of the clay is graded to insure good drainage, as blue-grass does not thrive on poorly drained areas. If the grounds have been graded so that undisturbed clay is at the surface it should be plowed or spaded. On recently filled surfaces this is not necessary. The surface material is then reduced to as fine a condition as possible with an ordinary garden rake, and upon it pure blue-grass seed is sown. A thin sprinkling of fine well-decayed fertilizer will help the young plants, but coarse and comparatively fresh manure should be avoided. The surface is then re-worked with the rake until the seed is just covered.

If this is done very early in the spring of an ordinary year no further treatment is necessary for some time, as the natural rainfall and slowness of evaporation at that season of the year will provide sufficiently for the seedlings. During dry seasons or periods, and especially if the effort is made rather late in the season, artificial watering will at first be necessary, but an excess of water should be avoided as the plants are forced to rapid growth, and become tender. The writer has succeeded in this

way in getting good sod from seed sown late in June.

Ordinarily, pure blue-grass seed should be used. This gives a more uniform, denser stand, which adds much to the beauty

of a lawn. When other seed, such as barley, oats, and so forth, is mixed with the blue-grass the latter is likely to be more or less crowded by the more rapidly growing grains. If such seed is added as a protection to the blue-grass seedlings it should be in relatively small quantities. Clover, with its tendency to mat, also crowds out the blue-grass, at least for a time.

Very frequently a crop of weeds will at first overtop the blue-grass, and these will serve as nurses for a time. They should, however, be checked before they are too tall to cut with a lawn mower. The first cutting will serve this purpose, and will usually leave a fairly pure stand of blue-grass. Cutting should be repeated sufficiently frequent to prevent the blue-grass from getting too tall for the lawn mower. This will give a denser and more uniform sod.

The subsequent care of the lawn calls for but little comment. It should not be watered frequently for the reasons already stated. It should not be cropped too closely, especially during dry seasons. However, a reasonable amount of cutting keeps it more uniform and denser. In places from which the snow is readily swept, or during snowless winters, a dry mulch, to be removed early the following season, will be of advantage. All this may be troublesome, but is practicable on small tracts.

The laying of sod is a practice not to be encouraged excepting in rare cases where the slopes are so steep that seeding is not practicable. The cutting of sod results in the removal of the deeper seated roots, and in our climate this is quite as objectionable as the transplanting of large trees. The roots form denser clusters near the surface, and are much more exposed to both dry winters and dry summers.

It is also objectionable because it is difficult to join the strips perfectly, and unless done by an expert the work is often unsightly.

Finally, sodding is expensive, an item which even the citizens of Iowa must take into account. The writer knows of a case where a board of supervisors in this state ordered the sodding of a square of public property at an expense of about \$2,800, when a better sod could have been secured by sowing seed at a total cost of not more than \$150. In this case the sodding was undertaken upon the advice of an "expert" who wanted the job,—and secured it.

In another case a man paid \$50 for sodding a part of his lot. A neighbor at the same time secured a better sod, seamless, dense and lasting, on an equal amount of ground, for an expense of \$3.50 in cash (for seed) and a little labor.

These illustrations show that the expense item is worthy of attention.

For these reasons the practice of laying sod should, in the vest majority of cases, be condemned.

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